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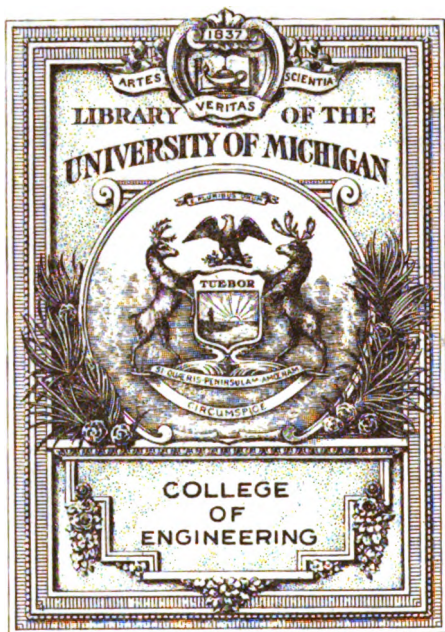
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... OFFICIAL PROCEEDINGS ...

St. Louis Railway Club

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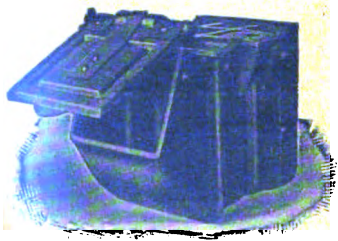
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ST. LOUIS RAILWAY CLUB.

MAY 11, 1917.

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VOLUME XXII. Containing paper on "The Safety Appliance Standards,
NUMBER 1. Their Purpose and the Reasons Underlying Their Fixed
and Definite Location," by Mr. Hiram W. Belnap,
Chief of the Division of Safety, Interstate Commerce
Commission.

OFFICERS 1917-1918.

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The regular monthly meeting of the St. Louis Railway Club was held in the auditorium on the 11th floor of the American Hotel Annex, Sixth and Market streets, Friday, May 11th, at 8 o'clock, President M. O'Brien presiding, and the following being present:

Adair, J. G.	Craig, F. G.	Keane, Jno. R.
Addis, Robert	Daly, M. F.	Keegan, Harry F.
Alsmeyer, Wm. E.	Damm, J. P.	Knight, T. K.
Ament, J. S.	Devanney, J. J.	Kraus, E. M.
Barber, H. E.	Dodd, S. T.	Kuhl, Robert J.
Barnard, H. C.	Donovan, W. T.	Lampe, Jos. A.
Barnard, W. F.	Driscoll, Thos. J. O.	Lawrence, Felix P.
Bauer, Otto C.	Eddie, B. F.	Layman, A. R.
Beck, C. H.	Einstein, R. E.	Lightner, H. A.
Beimdick, Emil J.	Elliott, W. P.	Loneragan, Edw. J.
Belnap, H. W.	Engles, F. F.	Lowell, R. R.
Bishop, E. G.	Everett, L.	Livingston, G.
Blesch, F. J.	Finn, W.	Lynch, W. M.
Bowler, R. W.	Frauenthal, B. W.	Marca, M.
Boyce, Theo.	Gantner, Wm.	Mattick, J.
Brase, G. F.	Gehm, Henry V.	Meadows, John
Breed, A. C.	Granneman, G.	Miller, A. R.
Bruckner, Edw. J.	Grayson, F. O.	Moffatt, J. H.
Bunce, C. V.	Grice, J. B.	Moody, Edwin C.
Burgess, T. M.	Halbert, M. W.	Moore, J. P.
Burke, J. C.	Harman, E. H.	Mosby, W.
Burlingame, Chas.	Hassett, H. J.	Mosher, L. W.
Burns, J. W.	Hays, T. C.	Mueller, E. G.
Bury, R. F.	Heacock, W. F.	Mueller, O. G.
Callahan, Cors	Herrmann, J. C.	Murphy, J. J.
Card, E. F.	Hilliar, H. L.	McCoole, A. F.
Carothers, J. B.	Hogan, B. W.	McCullough, B. H.
Cass, C. P.	Hudson, H. D.	McFarlin, J. R.
Ceathem, P. G.	Hurlburt, C. C.	McGowan, T. R.
Chenery, E. A.	Hurst, C. M.	McGrail, P.
Colby, B. H.	Johnson, F. B.	Nell, S. E.
Collett, R. H.	Johnson, G. A.	Niehaus, R. H.
Colleflower, W. A.	Johnson, W. L.	O'Brien, M.
Craig, Burt C.	Jones, C. E.	Packard, F. M.

Park, J. W.	Seally, R. M.	Townsend, C. W., Jr.
Patterson, Joseph K.	Schaefer, John	Trier, H. C.
Paul, W. F.	Schneider, J. C.	Trobaugh, E. G.
Pendill, F. C.	Seelar, L. F.	Trump, J. B.
Pemelle, F. E.	Sewing, A. J.	Turner, O. E.
Pfeifer, H. J.	Shaver, C. B.	Vaughan, James R.
Pietsch, F. H.	Sheehan, W. M.	Venverloh, B. J.
Pindell, T. H.	Shumway, C. O.	Vitt, Oscar E.
Place, C. W.	Siebenthal, R.	Wageley, Chas. M.
Pollard, A. L.	Smith, C. N.	Wallin, John
Powell, P. J.	Spering, E. H.	Wallin, J. D.
Rearden, Frank	Steinberg, G. H.	Walsh, Jno. J.
Redford, Fred	Steinmeyer, John W.	Wark, Robt.
Redford, John E.	Steuer, Otto A.	Watson, J. D.
Renaud, Thos. H.	Stickley, T. D.	Wehr, H. R.
Rich, Wm. J. P.	Stoelzle, F. A.	Weller, Frank
Rivett, R.	Struben, S. J.	Wilson, Frank T.
Roa, Wm. J.	Swartout, W. C.	Winter, F. G.
Robertson, B. S.	Teel, Chas. E.	Winter, W. G.
Rollins, Lee	Theby, J. F.	Wolf, O. E.
Rosenthal, John G.	Townsend, C. W.	Young, T. U.

THE PRESIDENT: Gentlemen, you will please come to order; all those who have not registered will please do so, members and guests alike.

The next order of business is the reading of the minutes of the previous meeting.

These minutes have been printed and forwarded to the members, and if there are no objections or corrections, they will stand approved as printed. It will be so ordered.

The next order of business is the election of new members; the Secretary will read the list of applicants.

(The Secretary read the list as follows:)

ELECTED TO MEMBERSHIP.

ACTIVE.

H. E. Barber, Chief Dispatcher, E. St. L. & S. Ry., 540 Washington Place, East St. Louis, Ill. Recommended by M. Marea and B. W. Frauenthal.

R. A. Chapman, Special Reclaim and Per Diem Clerk, Mo. Pac. Ry., 1195 Railway Exch. Bldg., St. Louis, Mo. Recommended by J. A. Somerville and Geo. W. Briece.

H. C. Ettinger, Master Mechanic, Wabash Ry., Decatur, Ill. Recommended by C. P. Cass and F. B. Johnson.

L. P. Hill, Claim Agent, C. B. & Q. Ry., Hannibal, Mo. Recommended by T. K. Knight and A. B. Koenig.

J. H. Hoffman, Station Service Clerk, Mo. Pac. Ry., St. Louis, Mo. Recommended by J. A. Somerville and W. H. Hhaley.

J. L. Hohl, Gen'l Agent, D. & R. G. Ry., 826 Pierce Bldg., St. Louis, Mo. Recommended by W. S. Williams and W. A. Steers.

Walter J. Hoyer, Steel Car Foreman, C. R. I. & P. Ry., 2009 De Soto Ave., St. Louis, Mo. Recommended by S. E. Nell and M. Marea.

P. O. Lehnerts, Chief Per Diem Clerk, Mo Pac. Ry., 1195 Railway Exch. Bldg., St. Louis, Mo. Recommended by J. A. Somerville and Geo. W. Briece.

John Locke, Stationary Engineer, C. R. I. & P. Ry., 3928A Lee Ave., St. Louis, Mo. Recommended by M. Marea and S. E. Nell.

Julius Mattick, Chief Clerk, Mechanical Dept., United Railways Co., Park Ave. and 39th Street, St. Louis, Mo. Recommended by M. O'Brien and J. P. Moore.

John L. Pearre, Car Foreman, C. R. I. & P. Ry., Carrie Ave., St. Louis, Mo. Recommended by M. Marea and S. E. Nell.

J. E. Pond, Asst. Steel Foreman, C. R. I. & P. Ry., 1931 E. Warne Ave., St. Louis, Mo. Recommended by M. Marea and S. E. Nell.

Leo E. Read, Asst. on Eng'r Corps, C. & E. I. R. R., Salem, Ill. Recommended by F. E. Turner and E. A. Craft.

J. W. Schoeffler, Clerk, Vice-President's Office, Wabash Ry., Railway Exch. Bldg., St. Louis, Mo. Recommended by C. P. Cass and F. B. Johnson.

Windfield F. Sweany, Master Mechanic, W. C. & W. R. R., Chester, Ill. Recommended by C. P. Cass and H. H. Burns.

E. G. Trobaugh, Clerk, Mo. Pac. Ry., 1195 Railway Exch. Bldg., St. Louis, Mo. Recommended by Geo. W. Briece and M. Marea.

ASSOCIATE.

James Adkins, Jr., Representative, Railway Sales Dept., The Patterson-Sargent Co., 1755 Railway Exch. Bldg., St. Louis, Mo. Recommended by M. Marea and A. F. McCoolle.

Kennie L. Crickman, Asst. Sales Mgr., Great Western Smelting and Refining Co., 3100 N. Broadway, St. Louis, Mo. Recommended by Robt. Collett and B. W. Frauenthal.

J. W. Hathaway, Asst. to Vice-President, Union Draft Gear Co., 1763 McCormick Bldg., Chicago, Ill. Recommended by M. W. Halbert & B. W. Frauenthal.

J. L. Markham, Johns Manville Co., 501 North Third Street, St. Louis, Mo. Recommended by A. H. Handlan, Jr., and M. Marea.

H. L. Metzger, Pres., National Ry., Inst. Bureau, 4th Floor Metropolitan Bldg., East St. Louis, Ill. Recommended by R. J. Hamig and Geo. B. Mueller.

C. D. Mitten, Supt. Car Dept., Armour Car Line, National City, Ill. Recommended by M. Marea and C. B. Shaver.

J. L. Terry, Representative the Q. & C. Co., 1942 Railway Exchange Bldg., St. Louis, Mo. Recommended by H. J. Pfeifer and B. W. Frauenthal.

THE PRESIDENT: Gentlemen, you have heard the reading of the names of the gentlemen who have made application for membership in the St. Louis Railway Club; these applications have been passed on favorably by the Executive Committee, and are now before you for your action; what is your pleasure?

(On motion of Mr. Chenery, duly seconded, the Secretary was authorized to cast the ballot of the Club in favor of the gentlemen whose names appear above.)

THE SECRETARY: The ballot is favorable, Mr. President.

THE PRESIDENT: Gentlemen, the Secretary reports a favorable ballot, and the gentlemen whose names have been read are now elected members of the St. Louis Railway Club.

The next order of business is the report of the Executive Committee.

At the meeting of the Executive Committee tonight, it was decided that all members of the Club who take service with the Government during the present war will have their dues paid by the Club; it is also requested that all members taking such service notify the Secretary, so that a proper record can be made and the Proceedings forwarded to them.

This being the last meeting of the Club before the vacation period, the Executive Committee will meet at regular intervals during the summer and attend to such business as may be necessary and will formulate a program for the fall and winter meetings.

The Committee will be glad to receive from the members suggestions as to subjects or on other matters of interest to railroad and allied interests.

These suggestions are to be forwarded to the Secretary and he will take care of them in the proper manner.

The next order of business is the reading of communications; have you any communications to be read, Mr. Secretary?

THE SECRETARY: I have no communications, except those which are in the nature of discussions of the subject of the evening, which will come up later.

THE PRESIDENT: This brings us to the next order of business, being the address of the evening.

This address is entitled "The Safety Appliance Standards and Their Purpose and the Reasons Underlying Their Fixed Location."

This address will be delivered by Mr. Hiram W. Belnap, Chief of the Division of Safety, Interstate Commerce Commission. The author, who is an authority on this very interesting and important subject, will give to those present the results of a great many years of thoughtful consideration of this subject.

Railroad men must, of necessity, recognize the far-reaching importance of all matters touching safety appliances, and in fact, in no field has this subject been a matter of more thought and endeavor than in the railroad industry.

Gentlemen, I take great pleasure in presenting to you Mr. Hiram W. Belnap. (Applause.)

THE SAFETY APPLIANCE STANDARDS, THEIR PURPOSE AND THE REASONS UNDERLYING THEIR FIXED AND DEFINITE LOCATION.

By HIRAM W. BELNAP,

Chief of the Division of Safety, Interstate Commerce Commission,
Washington, D. C.

Mr. President, Members and Guests of the St. Louis Railway Club :

I assure you that I appreciate fully the honor that has been extended to me in inviting me to meet with this Club, and to discuss before you, and present a paper dealing with such an important subject as the Safety Appliance Standards.

When I received the invitation from my good friend, Marea, whom I knew years ago when I was field inspector of the Commission, I hesitated, for fear of not being able to present to you such a paper as I thought this splendid Club was entitled to.

After another letter was received, again urging me to consider the matter, I thought it both fitting and proper that there might be made, as a matter of record, somewhat of a history, dealing with these standards, and with that thought in view, I have attempted to prepare a paper which I hope will prove both interesting and instructive.

A few years ago, not so long ago, either, I knew what the staying qualities of Mississippi River water was, because I was a brakeman of the Big Four Railroad between Alton and St. Louis when East St. Louis was rather a quagmire; where they had no street car system, and where the sidewalks floated off every time it rained. (Laughter.) So I feel somewhat at home in the atmosphere of St. Louis, and I do not feel at all like I was among strangers.

Following that, I spent a number of years in the field service, dealing with safety appliance matters, and later was picked up by the Interstate Commerce Commission and taken to Washington and put in charge of the administration, under the direction of the Commission, of all of the safety appliance and hours of service legislation. I feel, therefore, that I can say without egotism that I am qualified to discuss this important subject, because I feel that I have been with it almost from its beginning.

When we take into consideration what a wonderful system of

railroad transportation we have and the reason for its existence, and how rapidly it has grown, and the necessity that has brought about safety legislation, we can fully realize why it is that the strong hand of the Federal Government is absolutely necessary to bring about any system of standards that would stand the test of time.

In 1825 the greatest artificial system of transportation in the world was completed, which was the Erie Canal, and there are now men alive in the United States today who were living then. At that time not a mile of railroad was in this great Republic of ours; only three miles of quarry railroad existed, and that was in Massachusetts; nine miles of gravity existed in Pennsylvania, where horses were used to haul the cars up a steep incline that they might drift down by gravity.

In 1830 and 1831 the first railroad train bearing passengers ran on rails; in 1833 the longest railroad in the world extended from Charleston, S. C., to Augusta, Ga., which is now part of the Southern Railway system.

In 1855 (and there are many men in this room who were living at that time, I presume) all-rail communication was first established between Chicago and New York City, and between tidewater and the Ohio River. In fact, our railroad systems have been built, practically, since the Civil War. With these great systems of railroad, bringing with them the hazards and dangers of their operation, accidents naturally followed; they became so numerous that they attracted the attention of the public lawmakers; the first activity of any, outside of marine activities, of the Government, in its Life Saving Marine Service, was the legislation that was enacted dealing with railroad matters.

Now, with this introduction, I wish to bring to your attention for a little while the question of the safety appliance standards. I take this from the accident records of the Commission, which has required all the railroads to furnish the data under oath:

In 1893, when the law was enacted, the statistics show that 44% of all accidents to all trainmen were coupling accidents on roads; there were less than 6% during the past year.

In 1893, when these laws were enacted, it was possible to haul 512,000 tons per trainman per year; in 1916 they hauled 924,000 tons per trainman.

So that these laws have not only been safety laws, but they have been of economic value, and it would be utterly impossible today to handle the traffic on our railroads as it is now handled, without safety appliances, automatic couplers, and the use of brakes such as are now installed.

I have chosen for my subject tonight: "Safety Appliance Standards, Their Purpose and the Reasons Underlying Their Fixed and Definite Location."

The safety appliance laws are beneficent life-saving and accident prevention measures. The enactment of the original safety appliance law in 1893 marked the first attempt of the federal government to deal with the problem of providing greater safety in railroad operation. A few states, prior to 1893, had enacted legislation requiring automatic couplers, but, as a result of these state laws, there was a great lack of uniformity in the equipment of cars from the various states and a bad situation was made worse. The requirements of interchangeability of railroad cars make standardization and uniformity of regulation an absolute necessity, and it was finally recognized that uniformity could only be accomplished by federal legislation, applicable to all cars on all railroads throughout the country. This is a brief statement of the reasons for the enactment of federal legislation covering the field of safety appliances on railroads.

In the early days of railroad operation, the safety appliance equipment of cars on different railroads was arbitrarily fixed by different operating officers, and then, as now, opinions varied widely. In those days the interchange of cars was not thought of; each vehicle remained on its home rails, and there was no necessity for any standard of uniformity.

As the carriers' business grew, however, the necessity of eliminating delay incidental to transfer became obvious, and when the cars of one railroad began to be delivered to other railroads, one of the first lessons learned in this school of experience was the fact that better service could be given, repairs could be more promptly attended to, and a greater degree of safety for trainmen and switchmen could be provided by fixing standards for many of the appliances used on cars. For the purpose of creating a sat-

isfactory medium for a study of such problems, the Master Car Builders' Association, or rather the National Car Masters' Association, as it was first called, was organized. In this paper I shall discuss and endeavor to show how closely the recommended practices and safety standards of the Master Car Builders' Association have been followed in the safety appliance standards fixed by law and by the Interstate Commerce Commission order covering these appliances.

The early records of the association are incomplete, but regardless of this fact, however, the minutes of the third annual meeting, held at Chicago, Ill., June 9, 1869, contain quite a full discussion concerning a resolution offered, fixing a standard height for bumpers. In this discussion, it is said:

"Consequently, it is necessary, both for economy and safety to men in coupling, also for rapidity in making up trains, that the height of drawbars be as uniform as possible. Everyone familiar with the making up of trains knows that it is in consequence of the great difference in the height of buffers that so many of our men employed in coupling trains are injured, and lives lost, because drawheads do not come in line, one being high and another low, thus driving by and crushing the man that is in performance of his duty, or maiming him, frequently for life."

It will thus be seen that one of the very earliest matters discussed by the Master Car Builders' Association was standardization or uniformity; of course, dealing with a condition which at that time resulted in more accidents than occurred from any other one cause. Indeed the record shows that the question of personal safety of employes received prominence in the discussion before there was any discussion concerning rules of interchange between carriers.

Eight years later the matter of a uniform and standard location for ladders was first discussed, and while the idea received support, there were differences of opinion as to whether the ladders should be placed on the sides or on the ends of the cars. This difference of opinion was not determined until thirty-three years later when the Interstate Commerce Commission settled the dispute by requiring both end and side ladders on all cars requiring ladders.

In 1879 the association adopted the recommendation that running boards on cars should not be less than 18 inches in width and project $5\frac{1}{2}$ inches beyond the end of the car, the projecting end to be supported by two metal braces; and that there should be two good substantial steps of wrought iron of $1\frac{3}{4} \times \frac{1}{2}$ inch metal, fastened on each side sill at diagonal corners of the car; and further, that each box and stock car should have two ladders of not less than five steps each, of $\frac{5}{8}$ inch round iron, projecting $3\frac{1}{2}$ inches from the siding of the car, securely fastened to each end at diagonal corners, with a roof handhold directly over the ladder, the lower step of the ladder to be provided with a guard or projection.

In 1885 a committee reported upon the comparative advantages in the construction of freight cars with or without end platforms, and laid the foundation of what is now covered in the Commission's order under the heading "End Ladder Clearance."

Recognizing that, in order to provide proper safety, there should be a uniform location for hand brake shafts, a committee in 1875 recommended that the best possible position for brake shafts was the left-hand corner of the car, as one stands on the track facing the end of the car. While no definite action was taken on this recommendation at that time, it was adopted in 1879. Regardless of this fact, however, thousands of cars were placed in service that did not comply with this recommendation. Thirty years later, in 1909, a committee submitted to the Master Car Builders' Association a report definitely fixing certain standards in the construction of the hand brake. This report was submitted by letter ballot to the membership, to be adopted as recommended practice. The hand brake arrangement described in that report is the standard hand brake required by the Commission in its order issued two years later.

If there be any doubt in the mind of any one with respect to the necessity of legislation definitely to fix and locate standard safety appliances, this study of the record of the Master Car Builders' Association appears to be convincing that the recommended practices and standards fixed by that association, which are well recognized as the safest and best, but which were not mandatory, were deviated from in such a radical manner that it

was only through the strong pressure of legislation that the association's recommendations could be positive and permanent. Because of this failure of the railroads represented in the association to comply with their own requirements and standards, and the utter inability of the association to compel obedience to its safety recommendations, as well as the constantly increasing casualty list caused by the use of the link and pin coupler, the Congress enacted the first safety appliance law at the urgent request of many state commissions, the Interstate Commerce Commission, railroad employes and the public in general. This law applied to train and engine brakes, automatic couplers, grab irons and height of drawbars. Experience soon demonstrated the necessity for amendments, which were enacted to cover other appliances and which strengthened the law and broadened its application, so that now the national statutes as to safety appliances on railroads, so far as they pertain to the standards herein discussed, cover the following subjects: Power driving-wheel brakes on locomotives; appliances for operating train-brake systems; equipment of cars for operation of train-brake system and operation and use of train-brake system on cars in all trains to the prescribed percentage, and on all power-braked cars in trains; automatic couplers; grab irons or hand-holds; drawbars of standard height; sill steps; hand brakes; ladders and running boards; and grab irons on roof of cars at top of ladders.

All the foregoing are absolute, mandatory requirements in present effective force and operation, and are applicable to "all trains, locomotives, tenders, cars and similar vehicles used on any railroad engaged in interstate commerce," even if such trains, cars, etc., are themselves being operated in local or intrastate commerce.

The safety appliance act was finally supplemented by the act of April 14, 1910, which, by its terms, required the Interstate Commerce Commission, on or before October 14, 1910, to designate the number, dimensions, location and manner of application of the appliances provided for by section 2 of that act, and by section 4 of the act of March 2, 1893. Shortly after its passage the Secretary of the Interstate Commerce Commission arranged for a conference between a committee designated by the President of the American Railway Association and a committee representing the

Interstate Commerce Commission to take up and discuss the subject of the standards to be promulgated by the Commission. The first meeting of this committee was held in May, 1910, and other meetings were held in June, July and September of the same year. A formal hearing was held by the Commission on September 29 and 30 and October 7. When the question of arranging for the number, dimensions, location and manner of application of the appliances required to be fixed by the Commission was taken up, the committee representing the Commission was instructed to follow as closely as possible the M. C. B. standards and recommended practices concerning these appliances. In so far as it was possible to do so and provide the proper factor of safety, these instructions were strictly adhered to. In certain of these regulations the dimension or location of an appliance is fixed to the inch, and even to the fraction of an inch; and while this may seem, upon superficial view, to be arbitrary and unreasonable, the specified measurement in every instance is founded upon a good, substantial reason in which the factor of safety is involved.

In other words, mere uniformity is not alone the reason for the exact specification of measurements; the question of safety is also involved. I shall demonstrate that in each instance the precise and specific measurement not only conforms with almost literal compliance with the M. C. B. recommended practice, but also that the specified size or measurement is practically a requisite in the interest of the actual safety of train employees.

The measurements prescribed are also of incalculable practical advantage in enabling every railroad company to carry in stock appliances which, whenever repairs are necessary on any foreign car while on its line, will be found available in all respects for the necessary use to be made of it.

The reasons for the safety appliance laws and regulations must be clearly understood if they are to be intelligently complied with. The necessities of operation require that their interpretation must be instantly applied by the employees charged with the duty of carrying out the carriers' obligation of compliance. The whole body of these regulations must be made familiar to all to whom is delegated any portion of the carriers' duty to comply with them. It is because I believe that an understanding of the basic reasons

underlying these regulations will lead to a better understanding of the necessity for literal compliance with them, that I will emphasize tonight the practical reason for these regulations as they stand.

There were two good reasons why the hand brake was definitely located on the left side of the car. A large majority of cars already had the hand brake on the left side, and the M. C. B. recommended practice called for the hand brake on the left side of the car. Uniformity of location was required so that the hand brake could be located by an employe with certainty, even though he were working in great haste. Having the hand brake definitely fixed on one certain side of the car also removed the danger to an employe being fouled by the hand brake wheel on the adjoining car which sometimes occurred where brake shafts were applied indiscriminately on either side of the car.

The order requires the hand brake and air brake to operate in harmony. It is a well-known fact that if the hand and air brake do not work in harmony a gravely dangerous condition exists, by reason of the fact that the air brakes may be suddenly applied while an employe is operating the hand brake. He is then in danger of being thrown from the top of the moving car, or in case a club is being used, to have it strike his side with sufficient force to break a rib. I personally have seen brakemen with their sides bruised and bleeding from being struck by their brake clubs when using the hand brakes to assist in holding trains on heavy grades. This requirement, that hand brakes and air brakes operate in harmony, removes the menace described.

Another requirement is that while the hand brake may be of any efficient design, it must provide the same degree of safety as the design shown on Plate "A," which is substantially the design submitted by letter ballot to the Master Car Builders' Association in 1909.

Brake shaft dimension is fixed at not less than $1\frac{1}{4}$ inches in diameter. Brake shafts of smaller diameter were too often twisted off when brakemen attempted to stop heavy drafts of cars in hump yards where brake clubs were used in the ordinary performance of their work. The requirement that the brake shaft should be without weld is for the purpose of establishing with certainty, as

far as possible, that the brake shaft is of clean, clear metal. A welded brake shaft introduces an element of danger. Prior to the adoption of these standards inspection disclosed hand brakes with shafts broken at the weld. This led to the conclusion that it is not feasible in practice to determine merely by inspection whether or not a weld is a good one and that safety could only be secured by requiring brake shafts without weld. The requirement that the brake wheel shall not be less than 15, preferably 16, inches in diameter was adopted for the reason that it established a proper ratio in connection with the ratchet wheel, which was to have not less than 14, preferably 16, teeth. For every three inches the hand on the brake wheel moves, the ratchet wheel is moved forward one notch, thus furnishing the greatest degree of efficiency, and at the same time providing the greatest factor of safety for the employe manipulating the hand brake. If there were fewer notches in the ratchet wheel, the hand would travel much farther to reach a notch in the ratchet wheel, and in many instances efficiency of the hand brake would be impaired. The requirement that the brake wheel shall not have less than 4 inches clearance was for the purpose of providing sufficient room for an employe's hand when using the hand brake, as well as to correct an evil that was developing in equipping high-side steel gondola cars with brake wheels that barely cleared the tops of the ends of the cars, leaving but little room between for the brakeman's hands and not enough for a brake club. The size and weight of cars has constantly increased until the use of a club is frequently absolutely necessary in properly controlling the speed of the car, particularly in hump yards.

It may be interesting to know why the brake shaft was located not less than 17, nor more than 23, inches from the center of the car. The cars of greatest width at the time the Commission's order was under discussion were practically 10 feet wide. One-half of this width left 5 feet on each side from the center of the car. Beginning at the center of the car, the first requirement to be met was that the running board must be not less than 18; preferably 20, inches in width. This used up 10 inches of the 5 feet. The diameter of the brake wheel is 15, preferably 16, inches, and if a 16-inch wheel is used, one-half the wheel extending from the

staff to the edge of the running board would make the staff 18 inches from the center of the car, and it was to prevent the location of the brake staff nearer the center of the car that this minimum distance is prescribed, and under no circumstances can the brake wheel foul the running board. On many cars a brake-step board is used. To provide proper safety its minimum length should not be less than 28 inches, and by restricting the location of the hand brake shaft to not more than 22 inches from the center of the car, the brake-step board extends beyond the brake shaft a sufficient distance to furnish secure footing to employes, and at the same time does not extend into nor beyond the inside clearance of the end ladder. Inasmuch as the outside end of end ladders may be as far as 8 inches from the side of the car, a minimum length of tread of 14 inches is established for end ladders for the reason that all cars were not of sufficient width to insure the use of a ladder with 16-inch treads. Following these standards, cars can be built so that the ladders, brake-step boards, hand brakes and running boards will each furnish their full factor of safety without in the least encroaching upon one another.

In order that the hand brake wheel might not encroach too far upon the end ladder clearance and thus be a menace to brakemen using end ladders, the order provides that the brake wheel shall not extend to within 4 inches of the vertical plane limiting this clearance. By such an application, protection is furnished employes when using the hand brake and prevents them being struck by any portion of an adjoining car.

All of the arrangements shown in the Commissioner's order relative to the method of attaching the brake wheel and the ratchet wheel to the brake shaft, the brake chain to the brake shaft drum, and other details of construction were adopted for the reason that, after having been carefully considered by the Master Car Builders' Association, they had been recommended by that body to be adopted as recommended practice and were recognized as furnishing the proper factor of safety.

The safety appliance act specifies that all cars requiring secure running boards shall be so equipped. The Commission's order fixes their width at not less than 18, preferably 20, inches, and requires that they shall run the full length of the car at the center

of the roof. The width of running boards, you will note, is practically the same that was established as early as 1879 as the proper and safe width for running boards by the Master Car Builders and is the minimum that will furnish a proper and safe pathway for employes while passing over cars that many times are moving at high speed. To overcome a dangerous condition in running board construction, the order specifically provides that running boards shall be continuous from end to end of the car. In icy or frosty weather, great danger exists by reason of employes slipping while trying to descend from the tops of cars with metal roofs, and to meet this condition the order requires on such cars latitudinal extensions of not less than 24 inches in width. Refrigerator cars are usually equipped with ice hatches at the corners, and if so equipped, do not require these latitudinal extensions, as the danger of slipping is not present. Running boards on some cars had trapdoors in them that were often left open; and then, too, employes were constantly being injured by falling from and being thrown from the tops of cars by reason of tripping over the nails and other insecure methods of fastening running boards. To remove these dangers, the order states that while the running board may be made up of a number of pieces, it can not be cut or hinged at any point and must be securely fastened with screws or bolts. Considerable difficulty was experienced in making it understood that the so-called drive-screws, or fluted nails, could not be used in place of screws or bolts for the purpose of securing running boards to saddle blocks. Experience has shown that such drive screws do not properly perform the work demanded and their use is clearly a violation of the standardization order of the Commission. Recognizing the ever present danger to employes in passing from car to car, special provision is made to extend the running board beyond the ends of some cars for the reason that unless this is done the distance would be entirely too great for the average man to step from one car to the next one; and at the same time, in order to prevent the running board projecting so far beyond the end of the car as to strike adjoining cars, the order provides that the ends of running boards shall not be less than 6 nor more than 10 inches from the vertical plane from which end ladder clearance is reckoned. When running boards project more than four inches from the edge of roof of car they must be securely supported so

that in case an employe should step on the extreme end of a running board no danger will be encountered by the breaking off of the end of the board.

The question of the number and location of sill-steps and ladders received the most careful consideration of the Committee at each meeting, and at the hearing before the Commission the subject was discussed and referred to more than any other of the required appliances.

Both observation and experience had shown that men, unless a proper sill-step is furnished, will step on the arch bars, oil boxes and brake beams, even clinging to the ends and sides of the cars, while doing switching. To furnish proper safety, sill-steps of sufficient width of tread and close enough to the ground so as to be used conveniently, furnish the only means possible to prevent employes using other and more dangerous footholds in their work.

A great many cars were already equipped with 4 sill-steps and 4 ladders at the time the Commission's order was promulgated, and this condition was advanced as one of the reasons why all cars should be so equipped.

It was finally determined that 4 sill-steps were required on cars to furnish a proper degree of safety to men in switching.

The M. C. B. recommendation as to cross-sectional area for sill-steps and dimensions for ladder rungs was adopted for the reason that experience had demonstrated their safety.

The distance at which the sill step should be placed from the top of the rail, what should be the proper spacing of ladder treads and what distance should be maintained between the ends of cars was determined after interviewing and carefully measuring nearly 1,000 railroad men in different terminal yards. This scientific and practical method of determining how high sill steps should be from the top of the rail, what distance was necessary between the ends of the cars in order to provide proper safety to the men using end ladders, as well as to ascertain the proper spacing of ladder treads was undertaken so as to establish beyond question just what dimensions were proper and should prevail. It was found by these measurements that a man's average perpendicular step was about 19 inches. To prevent the application of ladder treads of uneven spacing that might be a menace and mislead employes

using ladders, particularly at night, it was decided that the spacing of ladder treads should be uniform, a variation of no more than 2 inches being permitted. A maximum distance of 19 inches was fixed, so that the average step a man may desire to make in ascending or descending a ladder could not be exceeded.

The question of end ladder clearance was determined after it had been found that the average measurement of a man from his hip to his knee was $22\frac{7}{8}$ inches. Cars were being built with end ladders that constituted a menace to employes required to use them, for the reason that the clearance space furnished at the end of each car in some instances did not exceed 8 or 9 inches, and in some cases, where the cars had truss rods extending across the end of the car, even this slight free space was encroached upon. It can thus be seen that a fundamental safety requirement is inherent in the end ladder clearance required on every car. Safety for employes using end ladders requires a space between the ends of the cars greater than this average distance, so for this reason it was determined that when cars were coupled together the end of the cars above the end sills should not be closer than 24 inches. It was found that this could be provided in all classes of equipment by fixing the basic point from which to measure on a line in a vertical plane passing through the inside face of the knuckle when closed, with the coupler horn against the buffer block or end sill. This end ladder clearance is only required for 30 inches from the side of the car for the reason that that distance was found sufficient to cover the end ladder location on all classes of equipment.

If end ladders only were provided on cars a material element of danger would be present in using them when being switched in yards and also on account of the closing in of cars at the corners when rounding curves. For every degree of curvature the cars at their corners close in .42 of an inch, so that on 10 to 15 degree curves, many of which exist, particularly in yards, the corners of the cars are from 4 to 6 inches closer together than when the cars are on straight track. To eliminate this danger side ladders, as well as end ladders, are required. On the other hand, if only side ladders were provided on cars, there would be a material element of danger present in using them on account of the close clearance of many bridges, tunnels, buildings, freight houses, and the ex-

tremely limited clearance between tracks, particularly in the eastern portion of the country, where the tracks were built when cars were much narrower than the present equipment. The end ladder furnishes protection when working in such places. By equipping the cars with both end and side ladders, the employe has opportunity to choose the ladder which he shall use according to the conditions surrounding his work. By this means the safety of both types of ladder equipment is provided.

The proper location for side and end hand-holds was determined by the same method and manner as used for the location of sill steps, spacing of ladder treads, and end ladder clearances. Employes were interviewed and measured for the purpose of determining at what point it was best to place these safeguards, and it was found by these measurements that by placing the side and end hand-holds not to exceed 30 inches above the center line of the coupler, the best possible location was provided as this location was found to be the point the average of all employes measured. This location coincided in part with the M. C. B. standard covering side and end hand-holds. In order to prevent hand-holds being applied too far below this location and to establish practical uniformity, a variation of not to exceed 6 inches below this point was named as a limit. In addition, in order to provide proper safety for employes required to couple and uncouple air hose, it was found necessary to place hand-holds on the face of the end sills so that in case cars were suddenly or unexpectedly moved an employe might have a close and convenient hand-hold to grasp and thus protect himself from serious injury or possible loss of life. On cars having platform end sills an additional end hand-hold is required, placed not more than 60 inches above the platform end sill. This hand-hold serves as a protection to employes when crossing over cars on the end sills and its necessity is plainly apparent. The earliest recommendation covering hand-holds made by the Master Car Builders' Association provided that they must be 2 feet in length, but this dimension had been changed from time to time until hand-holds 12 inches in clear length were recognized as meeting their safety requirements. When the question of definitely fixing the dimensions required by the safety appliance acts came up for discussion by the committee fixing the standards, it was very readily

decided that no hand-hold would furnish the proper factor of safety to employes unless its clear length be at least 16 inches. After consideration and further investigation in regard to all classes of cars, a slight modification was permitted in the equipping of cars with certain end hand-holds 14 inches in length. This can be done only when the construction of the car renders it impossible to use 16-inch hand-holds.

The use of many types of couplers led to the use of several different kinds of uncoupling mechanisms. Uncoupling levers that were actually a menace to the employes required to use them were in use on some classes of equipment. A tabulation of all the cases that have been prosecuted under the safety appliance acts recently made disclosed the interesting fact that approximately one-half were for inoperative and defective uncoupling mechanisms. The Commission's order does not require any particular type of an uncoupling lever but clearly states that the uncoupling levers may be either single or double and of any efficient design. The Master Car Builders had discussed at different times the proper method of arrangement for uncoupling levers and had adopted what is shown in the Commission's order as Plate "B" as their recommended practice for the application of that type of an uncoupling lever. With a few necessary changes definitely fixing certain dimensions that were required clearly to establish proper safety in the method of application, these recommendations were adopted by the Commission as part of its order.

If other types of levers are used, they must extend a sufficient distance from the center of the car to insure that an employe using them shall not be between the ends of the cars while doing so, and if of the rocking type, safety requirements are only met when a lock or stop is used that will prevent the inside end from flying up and over in case of breakage, accidents from this cause having frequently occurred.

In the early records of the Master Car Builders' Association are found many discussions relative to the use of lag screws and even nails in applying hand-holds, ladder treads and other appliances on cars. For many years it has been recognized as the best practice to use only bolts or rivets in the application of these ap-

pliances. The safety appliance acts required that the manner of application should be definitely fixed, and inasmuch as the greatest safety could only be furnished by the use of bolts or rivets, such requirements were made positive. There are a number of other requirements of the Commission's order that are so apparent as to the necessity and reasons for their application that after you have so patiently listened to this already unduly long paper, I can not burden you with further statements or remarks concerning them.

I have called attention to various appliances required by the Commission's order on car equipment to provide greater protection and safety to employes in their hazardous occupation and I know you will be interested in learning whether or not the accident record of the Interstate Commerce Commission shows that greater safety has been provided by the standardization and use of these additional safeguards.

From the statistical reports of the Interstate Commerce Commission, figures covering two five-year periods have been taken and the results compared. These figures show average results for five years immediately preceding and for five years immediately following the issuance of the Commission's order of March 13, 1911, namely, 1906-1910 and 1911-1915. Five-year averages are taken for the reason that more uniform results are thus obtained than could be secured by comparing the figures for single years.

Dealing first with the public service of the railways in the two periods, we find that the number of locomotives in service increased from 55,990 in the first period to 63,365 in the second period, an increase of 13%; cars increased from 2,165,059 to 2,439,862, or 13%; the number of cars per train increased from 27.2 to 31.3, or 15%; the tons per train grew from 359.3 to 432.3, or 20%; the number of tons hauled one mile increased from 228,936,078,705 to 276,882,678,387, or 21%. The smallest increase shown is in the number of employes actually engaged in the movement of trains. This increase was from 294,915 to 310,590, or 5%. Placing these figures in tabulated form for easy comparison, we have the following:

	Average for 1906-1910	Average for 1911-1915	Increase Per cent
Locomotives in service.	55,990	63,365	13
Cars in service.....	2,165,059	2,439,862	13
Cars per train.....	27.2	31.3	15
Tons per train.....	359.3	432.3	20
Tons hauled one mile..	228,936,078,705	276,882,678,387	21
Employes in train service.....	294,915	310,590	05

In the first five-year period there were 1,219 employes killed and 15,910 injured while engaged in coupling and uncoupling cars. In the second period the number killed was reduced to 857, a reduction of 30%, and the number of injured fell to 14,245, a reduction of 10%. In accidents to employes, due to falling from cars and getting on and off cars, the results were not so favorable. While the number killed fell from 3,247 to 2,537, a total of 710, or 22%, the number of employes injured increased from 59,006 to 68,179, a total increase of 9,173, or 16%.

These figures are significant only as indicating a tendency, and I do not want to be understood as claiming that all the improvement shown is due to the Commission's order. That is perhaps the determining or controlling factor, and because of its existence other factors of safety have been brought into play. It is clear, however, that the tendency is toward greater safety, and while giving full credit to other factors, we are justified in concluding that the laws, through the Commission's methods of administering them, are substantially accomplishing the purpose of their enactment.

Following the history of all legislation, the act requiring these uniform standards has very properly been brought before the courts for adjudication, for no law has any compelling force until it has run the gauntlet of the courts and received judicial interpretation.

The courts have wisely treated these regulations as absolute, fixed and mandatory rules, which under all circumstances must be obeyed, that the precise measurements prescribed are essential

to uniformity, and that uniformity is a reasonable requirement for safety.

These propositions are strongly supported by a recent decision of the Supreme Court of the United States in the case of *Illinois Central Railroad Co. v. Williams*, decided January 8, 1917, the court holding that section 2 of the act of April 14, 1910, is in present effective operation, notwithstanding the extension of time granted for conformity with the Commission's order authorized by section 3 of that act, and said of the purpose of the latter section:

"It is equally clear that the purpose of the 3rd section is to require that the safety appliances 'provided for by section 2 of the act' shall ultimately conform to a standard to be prescribed by the Interstate Commerce Commission; that is, that they shall be standardized, shall be of uniform size and character, and, so far as ladders and hand-holds are concerned, shall be placed as nearly as possible at a corresponding place on every car so that employees who work always in haste, and often in darkness and storm, may not be betrayed, to their injury or death, when they instinctively reach for the only protection which can avail them when confronted by such a crisis, as often arises in their dangerous service. It is for such emergencies that these safety appliances are provided—for service in those instant decisions upon which the safety of life or limb of a man so often depends in this perilous employment—and therefore this law requires that ultimately the location of these ladders and hand-holds shall be absolutely fixed, so that the employe will know certainly night or day he will find them in like place and of like size and usefulness on all cars, from whatever line of railway or section of the country they may come."

When the significance and far-reaching effect of this decision of the Supreme Court of the United States becomes fully appreciated, I feel assured that even a better record will be established, not only in a reduction in casualties to employees, but also in the number of defects discovered by the inspection service of the Commission. I believe that this can be brought about by the systematic education and training of all employees responsible for the equipping and maintaining of the required safety appliances.

For many years the Interstate Commerce Commission has distributed thousands of copies of the safety appliance acts and the Commission's orders issued pursuant thereto, and arrangements have been made so that they can be secured in any number at the cost of publication from the Superintendent of Documents, Government Printing Office, Washington, D. C.

These pamphlets should be placed in the hands of all employees charged with any duty in maintaining these safeguards if full compliance with all the requirements of the safety appliance acts is to be expected.

I wish to express to you my gratitude for the kind consideration you have given me in so patiently and attentively listening to this lengthy paper. If it adds just a little in the way of assistance to bring about bettered conditions, or if its explanations clear up any doubtful point that may have existed in the mind of any one concerning these standards, then I assure you that I am amply repaid for the time it has taken to prepare it. (Applause.)

THE PRESIDENT: Gentlemen, we have all been very deeply interested, I am sure, in Mr. Belnap's paper.

The Secretary will now read some very interesting comments that have been received from those who have had the opportunity of reading this paper.

As in all cases of this kind, copies of this paper were sent out, and discussions were requested of those who received the copies.

The Secretary then read the following:

MR. F. W. GREEN (Asst. to First Vice-President, St. Louis-Southwestern Ry., St. Louis, Mo.): The St. Louis Railway Club is fortunate in being the medium through which the author has contributed a noteworthy addition to the literature of safety appliances.

The historical and scientific development of these standards as brought out by the author, is new to many, and interesting to all of us. When railway development was in its pioneer stage, the necessity for a perfect co-ordination in safety appliance matters was not fully appreciated. It perhaps first presented itself in air brake problems. The success of the air brake manufacturers in working out this problem encouraged the hope that other items were possible

of solution. I think it may now be said that these problems are now well on their way toward final solution, and it must be a source of gratification to Mr. Belnap to know that he has played a very important part in bringing this about.

To my mind the problem of today is not a higher state of perfection in safety appliances, which have already been provided, but rather their proper use by railway employees. While it is true that there has been a great reduction in the number of employees killed and injured, as shown by Mr. Belnap, it is nevertheless also true that a large number of accidents are occurring to employees through their own negligence. The railway operating officer of today should deny employment to the men who are naturally clumsy, and by habit and temperament not possessed of those qualities of prudence, caution and alertness which are the fundamental requirements for men in train service. And if, unfortunately, such men are already in the service, they must be either educated out of these habits or eliminated before they are included in the list of killed or injured.

MR. T. PAXTON (Supt. Motive Power, El Paso & Southwestern System, El Paso, Texas): I have read Mr. H. W. Belnap's paper entitled "Safety Appliance Standards, Their Purpose, and the Reasons Underlying Their Fixed and Definite Location," with a great deal of interest and consider the paper of very decided value to the railroad fraternity and especially to those charged with the maintenance of these needful safety standards.

This paper constitutes an important contribution to the literature of the general safety appliance subject, and in its historical and technical review of that subject goes far to make clear the position of the government with relation thereto, and to explain many points of interest with regard to details that have been more or less mystifying.

Mr. Belnap pays proper tribute to the labors through many years of the M. C. B. Association in developing these standards and explains their inability to secure that uniform adoption, necessary to the protection of train operatives, which led up to the Federal enactments now controlling this important work. There can be no question of the value of the uniform results that have grown out of the adoption of the United States Safety Appliances Standards.

The writer begs to express his appreciation of the value of Mr. Belnap's services in the contribution of this paper.

MR. C. E. OAKES (Mechanical Engineer, Kansas City Southern Railway Company, Pittsburg, Kansas) : This will acknowledge receipt of yours of the 21st, enclosing transcript of paper on safety appliances, which will be read in the near future, before the St. Louis Railway Club.

I have read this paper over carefully and found same to be very interesting and giving one a better understanding as to the line of reasoning used and methods of arriving at the various conclusions:

I can see no chance for criticism on this paper.

THE PRESIDENT: Gentlemen, this paper is now open for general discussion; if any of the gentlemen can add to the discussions of the paper already read, I hope you will do so, while Mr. Belnap is here, as he will gladly answer any questions that may be asked.

MR. E. A. CHENERY (Supt. Tel. Mo. Pac.), St. Louis, Mo.: Mr. President, I was one of the gentlemen who were asked to discuss this paper; I neglected to turn my reply over to the Secretary, so I will be obliged to read it myself. I have read with much interest the advance copy of Mr. Belnap's paper which was sent me for discussion and wish to commend the author and congratulate the Club for the very thorough and comprehensive treatment accorded the subject. The paper not only gives the "WHY" of certain car construction methods to better meet safety requirements, but is a historical record of the channels through which various safety features connected with car accessories have reached their present status.

The old but true quotation that "Eternal vigilance is the price of safety" is exemplified in the doings of the several associations and Railway Clubs throughout the country where matters relating to the construction and operation of railways is constantly being discussed.

Mr. Belnap's paper will not only be read for the information it contains, but without doubt will stimulate other associations and individuals in an endeavor to secure uniform methods having for an

object the safety of employes as well as the economy of operation and the increase of efficiency.

Equally as applicable to safety methods for trainmen is the subject of clearances and the thought that came to me as I read the paper under discussion; was the manner in which wire crossings over railroads had been neglected by the several states and utility companies. The hazard a trainman is subjected to when on top of a car in a moving train passing under a suspended wire is frightful to consider when it is realized that from obvious causes—either faulty construction or neglected maintenance—he may be caught by a wire and pulled off the car.

Railroad managements and associations have had the matter brought to their attention many times in the form of personal injury and death claims and have attempted to correct the cause by prescribing specifications that would eliminate the damage, but without the aid of State or Federal laws little progress can be made.

Government officials have recognized the conditions and the Bureau of Standards, in an effort to secure uniformity in construction, maintenance and operation of high and low-tension circuits, generally, have devoted much time in inquiry of the several utility companies, associations and State Commissions as to local conditions, and have recently compiled a set of rules and regulations that embrace not only crossings, but other safety methods for employes handling such circuits, which, while not entirely satisfactory to all interests, are in such form as to make towards uniformity. This Bureau is now asking that the rules and regulations in question be placed on trial for a period of one year, at the expiration of which time a general expression will be secured as to their general adoption. State Commissions are slow to act upon such matters and they can only be handled to advantage through Federal jurisdiction.

While this has no direct bearing on the paper presented by Mr. Belnap, it nevertheless is indirectly related to it and serves as my individual endorsement of the plan to secure uniformity of all such matters.

MR. PRESIDENT: We will now call on Mr. Burlingame.

MR. CHAS. BURLINGAME (Supt., The Wiggins Ferry Co.): I read Mr. Belnap's paper with a great deal of interest and will say that I

am acquainted with the safety appliance law and know it has done a great deal for safety and efficiency in the operation of American railroads. It is good that these safety laws are national in their character for the very reason, as stated by Mr. Belnap, that the opinions of the different officials vary. In such matters it does take some great centralized power to enforce widespread beneficial action.

The railroads have likewise experienced, in the handling of explosives and other dangerous articles, the beneficial results of Federal regulations, but should be let alone now and others, who are more in need of regulating, get a taste of it.

Spread the regulation around. Other big business besides the railroads need a government regulation bath. I know there are several matters wherein shippers should be regulated. Some regulative body should take hold of the question of marking, packing and loading of freight. If done it would increase the efficiency of our railroads and greatly promote national economy.

Poor marking causes many packages to go astray and volumes have been printed on the wastes going on by reason of poor and insufficient marking of shipments.

Cars are getting larger and engines stronger, but the packages are getting weaker and weaker all the time. Shippers will never fall into line I fear in the matter of marking and packing until there is some supervision, backed by the strong arm of the law, which will compel them to pack their shipments in a proper and safe manner, pack them indeed so they will be in good condition when they reach their customers at the opposite end and will not have to be shipped back, with claims following, on account of weak or careless packing.

Then as to loading cars scientifically, stowing the freight properly and loading equipment to capacity. Shippers are not today loading cars properly nor to near their capacity; according to old custom they are half loading cars with cotton, bricks, canned goods, barrels, and the like; whereas, shippers should not only be educated but forced to furnish full car-loads or pay for all the room in the car. They will never do this until the law steps in and makes them load the cars to capacity, for competition forces the railroads to take most any kind of treatment the shippers care to hand them.

Furthermore, in my opinion, there should be a car-owning trust established, so the railroads could rent their cars from the trust. The

trust could distribute cars in the country like the general government now distributes its dollars, through regional distributing points. Then we would not have cars running back and forth empty in both directions; we would get a maximum efficiency out of them. If we could get this the railroad owners would find they were better off; they would make more money with less effort. They would discover what they found to be true in the safety appliance law, that it was a good arrangement. We have found out we can do things safely in our railroad yards and get just as far, even farther, than they got in the old days by doing the same thing in a furious and haphazard way; when they tried to work too fast and by so doing took chances with life, limb and property. You get just as far by doing things carefully and safely as you do by hurry-up methods.

One objection I have to the safety appliance law is that there are too many different makes on the market designed to do the same thing. Railroads all over the country are required to maintain hundreds of thousands of dollars' worth of the same kind of appliances of different make in order to take care of the different roads' cars. If we had a car-owning trust this would be done away with to a great extent. A lot of the money tied up in these different appliances represents an economic waste which sooner or later must be stopped.

I dare say the Government will bring about these efficiency methods, maybe under the stress of war. There certainly never was a time in the history of this country when there was such necessity of getting efficiency out of men, getting efficiency out of cars and getting efficiency out of locomotives on our railroads, as there is today. As I have suggested, probably under the pressure of war (they might never come to pass except by such a great upheaval) efficiency methods will grow by leaps and bounds.

I am sure there are some here tonight who were not acquainted with the really scientific manner in which cars are constructed. This review which has been given to us by Mr. Belnap will enlighten many on points they had never thought or dreamed of. Some of the standards, we find by listening to Mr. Belnap, were discovered as early as 1879, so the old-timers must have known a heap about car construction. Mr. Belnap has shown us how everything on a car has been carefully studied out from a practical standpoint, and that cars are more scientifically constructed than most people and many railroad

men realize. His paper, going back, as it does, to the beginning of this law, and bringing it right up to date, is a very valuable document, and will stand near the top in the clubs' dignified records. It is one of the best papers I have listened to in the club, from a historical standpoint, and because it is on a subject which is so nicely within the scope of the St. Louis Railway Club. (Applause.)

THE PRESIDENT: Is there any other gentleman who wishes to discuss this paper? I will call upon Mr. Marea, late President of this Club. (Applause.)

MR. M. MAREA (Gen. Supt. St. L. T. & E. Ry.), East St. Louis, Ill.: Mr. President and gentlemen—I assure you it affords me great pleasure to be here tonight and listen to the paper presented by Mr. Belnap. While I do not class myself among the old men in the business, nevertheless I have had experience in my time with the introduction of safety appliances from the infancy of the movement to its present status.

In the early days, as a brakeman on the Baltimore & Ohio, Chicago Division, I can remember very distinctly running over box cars where the running boards stuck up at the ends, and at times when there was sleet on the cars, going over and getting down on the side of the car, taking hold of the grabiron at the top and getting over the side, figuring that there was a ladder there; I would start to go down the side of the car, get my foot over the side—no ladder there; then I would have to swing around to the end of the car, where the grabiron on the top of the car was lengthwise of the car, and I would find the ladder on the end.

It was all very misleading—no standards whatever. And those things were put there by whom? Why, by anyone that saw fit to place the ladder where it was placed—sometimes eighteen inches from the end of the car; sometimes two feet; sometimes near the center of the car; sometimes very close to the edge; sometimes it had a spike to hold it; sometimes a lag-screw—very seldom or never a bolt, giving safety to the employe who would get hold of it and throw his weight on it to swing down to descend to the ground.

A great many times it was fastened upon a roof board which was loose—fastened there with a couple of nails.

I came here tonight with the full intention of attacking some of the things brought up by my friend Belnap, but I find myself in such a hopeless minority that I have nothing whatever to say; I can only add to the eulogies and favorable comments that have been made of this most excellent paper.

Mr. Belnap brought out some very strong points in regard to the Federal Government enacting the laws. Those laws, enacted by the Government, have been based upon what? Almost uniformly they have been based upon the recommendation of the Master Car Builders, an organization which has been in existence since 1866. The Master Car Builders have urged the owners of railroads to adopt these standards.

In the beginning, every operating officer of a railroad thought he had a better standard than the other fellow, and did not treat the recommendations of the Master Car Builders with the consideration with which they should have been treated. The result was that the Federal Government had to step in and make a universal law applicable not to one, but to all. It was necessary to compel all the roads to adopt these standards; and the only law, and the only rule that becomes a good law, or a good rule, is one that must be lived up to literally, or you must abide by the consequences—fine or imprisonment, or both.

None of us want to go to prison, and none of us want to be fined, and consequently, we are all going to be good and live up to the laws as promulgated by the Commission.

Had we stepped out in the early days and followed the recommendations of the Master Car Builders' Association literally, I dare say that today the Interstate Commerce Commission would not have to have its men in the field inspecting the cars and watching to see that each and every one of us followed out the standards as prescribed by the Master Car Builders, and practically adopted by the Interstate Commerce Commission Department of Safety.

That is what has brought about this condition—the clear violation on the part of every one of us; we all participated in these violations—I had my own way, and you had yours; every fellow had a different idea, and thought that the other fellow was a fool and didn't know what he was doing.

It resulted finally in the Government stepping in and saying "Now, boys, you are not all fools; you are not all wise men; but we are

going to make a law, the best law we can, and require that you live up to it, and in so doing, we will all live in peace and harmony."

That is what has brought about the peace and harmony and unity and strength of the railroad men today. That has been shown in respect of the operating department, the mechanical department and the passenger department—all working for the one object—success, and the prevention of accidents and the increase in efficiency in every particular.

In view of that fact, and in view of Mr. Belnap's coming before us tonight from a far-distant city, to be present with us and to read to us this paper and to listen to the discussions and criticisms of the various points that come up, I wish to make the motion that this Club extend to Mr. Belnap our heart-felt thanks, and that we express our appreciation by a rising vote. (Applause.)

MR. T. K. KNIGHT (C. C. to Genl. Supt. C. B. & Q. Ry.), St. Louis Mo.: Mr. President and gentlemen: I was one of those who was fortunate enough to receive an advance copy of Mr. Belnap's paper, and I enjoyed it immensely.

It promises mighty well for the new administration to start off with such an interesting topic and to have it handled in such an able manner as has been done by Mr. Belnap. Ordinarily, this would have been a dry and a technical subject, but Mr. Belnap has given it that peculiar touch of the master which renders the paper entertaining as well as instructive from beginning to end.

Of course, Mr. Belnap has handled it so thoroughly that nothing could be added to it, but there is one feature that ought not to be overlooked and that is the wisdom, and we might also say the forbearance, with which the Interstate Commerce Commission has dealt with the railroads; not only in regard to safety appliances but in reference to all other matters of regulation, and more particularly the superiority of regulation by Commission as compared with direct legislation, state or interstate.

Regulation by commission is most generally constructive while regulation by legislation is very liable to be destructive.

The Commission did not insist upon anything but what had been already tried out and adopted to a considerable extent and therefore

known to be practicable. Also ample time was allowed to bring about changes in existing equipment.

Just think how different this thoughtful and conservative handling on the part of the Commission is as compared with the heedless, head-long, often-times spiteful and confiscatory, handling of matters of regulation directly by the Legislatures or by Congress. Sometimes legislators and Congressmen are misguided, misinformed and over-zealous when it comes to matters pertaining to the railroads, but for the most part they are actuated by their own selfish interests and take no steps to find out what the results of their acts are going to be; such regulation is bound to be faulty at times and extremely dangerous, if not absolutely destructive.

We are mighty glad to have Mr. Belnap with us tonight and the fact that we are glad to have him and the fact that it must not be altogether unpleasant to him to be here is a mighty good sign that there is the right kind of feeling as between the railroads and the Interstate Commerce Commission.

Mr. Belnap has given us a lot of information which the most of us could not have gotten in any other way and we are certainly under long and lasting obligations to him and we hope that this may be by no means the last time that Mr. Belnap will be the guest of the St. Louis Railway Club.

It gives me great pleasure to second the motion that Mr. Belnap's paper be published in the proceedings, and that a standing vote of thanks be tendered Mr. Belnap for his presence with us tonight, and for the most excellent paper that he has presented to us. (Applause.)

THE PRESIDENT: Gentlemen, you have heard the motion which has been duly seconded, and I take it there will be no opposition to it whatever.

I will ask that the St. Louis Railway Club extend its thanks to Mr. Belnap for his participation in the program of this evening by a rising vote. Be seated, gentlemen. The motion is carried unanimously.

Mr. Belnap, this is concrete evidence of the appreciation of the St. Louis Railway Club of your most valuable paper, and on behalf of the Club, I desire to thank you for the clear and explicit presentation of this most important and vital subject which you have given us. The manner in which you have presented the subject has clearly

shown the great need of your department and the great strides that have been made in behalf of your co-operation with the railroads of this country.

The thanks of the St. Louis Railway Club are extended to you, and I assure you that we thoroughly appreciate your being with us tonight. (Applause.)

MR. BELNAP: Mr. President and gentlemen of the St. Louis Railway Club—I certainly appreciate being here with you this evening. I dare say you are not half as glad to have me here as I am to be here, and I trust that at some time in the future I may have another opportunity to meet with the St. Louis Railway Club, to our mutual advantage. (Applause.)

THE PRESIDENT: The next order of business will be a motion picture film entitled "The King of the Rail," which we are enabled to present through the courtesy of the General Electric Co.

I take great pleasure in introducing to you Mr. S. T. Dodd, representing the General Electric Company. (Applause.)

Dispensing with any extensive preliminary remarks after the room was darkened, Mr. Dodd's presentation of the subject consisted of running remarks accompanying the pictures as they appeared upon the screen.

These pictures illustrated the electrification of one of the mountain divisions of the Chicago, Milwaukee & St. Paul Railroad in the western part of our country. This division crosses three mountain ranges, and covers a stretch of 440 miles.

Power is generated by means of waterfalls at fourteen power stations; this power being used for distribution to adjacent cities and communities, in addition to its use for the propulsion of freight and passenger trains.

The construction of electric locomotives, from the assembling of the frame and the motors, to the completed engine was shown; the process of regeneration of electric force was explained, by means of which 50% to 60% of the power required to carry a train up a grade is restored to the line during the train's travel down grade.

Then followed what might be termed a historical resumé of transportation. The laborer was shown, slowly working out the problem

of transporting the newly-cut tree trunk and the ponderous stones which impeded his efforts at cultivation; his first efforts were in the direction of carrying these things by main strength; then the idea of rolling them entered his mind; this was succeeded by the expedient of dragging over the surface of the ground; the combination of rolling and dragging in time resulted in the wheeled vehicle, at first propelled by oxen, afterwards by horses, and in the course of time, building one improvement upon another, came the carefully prepared right of way, with metal tracks, and the steam engine was born.

The introduction of the steam locomotive was then graphically shown; the DeWitt Clinton, the "tea kettle," with its train of quaint stage-coach passenger accommodation, puffed up and received its load of bell-crown hatted male and crinoline-skirted female passengers; carpet bags and leather trunks were placed on board by the passengers, the then unheard-of "baggage smasher" of later development being conspicuous by his absence from the scene.

Then followed the horse-car, and the early electric street car, the forerunner of the wonderfully efficient electric locomotive of the present day.

The westward trend of emigration called forth the best efforts of American inventive genius; the prairie schooner of the pioneer gave way to the locomotive, and the joining of this great continent from coast to coast by bands of steel was an accomplished fact.

The second reel illustrated the manner in which the electric locomotive is manufactured and assembled; interiors of the factories were shown, giving views of ponderous machinery, powerful cranes, lifting and transporting enormous weights, and the marvelous work of the oxy-acetylene flame.

The third and last reel showed the complete electric locomotive in action, and showed the superiority of electricity over steam for tractive purposes.

THE PRESIDENT: Gentlemen, you have all seen these very interesting pictures, showing the method of electrification, and the progress which has been made in the matter of transportation within the past

50 or 60 years; are there any gentlemen who wish to discuss this subject or ask any questions?

MR. HERMAN J. PFEIFER (Eng. M. of W. T. R. R.) : Mr. President—I think we are under very great obligations to Mr. Dodd and to the General Electric Co. for giving us an opportunity to see the actual working of the electrified section of the Chicago, Milwaukee & St. Paul Railroad. I move that a vote of thanks be extended to the gentleman for this very interesting lecture.

(Motion seconded and carried.)

THE PRESIDENT: Mr. Dodd, on behalf of the St. Louis Railway Club, I desire to extend to you and to Mr. Turner and the General Electric Co. the thanks of the Club for this most excellent entertainment.

The next order of business is the reading of applications.

APPLICATIONS FOR MEMBERSHIP.

ACTIVE.

Thomas M. Howard, Asst. Car. Dist., Mo. Pac. Ry., 1265 Goodfellow Ave., St. Louis, Mo. Recommended by J. A. Somerville and W. H. Haley.

ASSOCIATE.

Paul Henrie, Tracer, American Brake Co., 4121a Prairie Ave., St. Louis, Mo. Recommended by F. G. Guilfoyl and R. E. Adreon.

Clarence C. Hurlburt, Salesman, Ahrens & Ott Mfg. Co., 810 N. Second St., St. Louis, Mo. Recommended by Wm. J. P. Rich and B. W. Frauenthal.

Chas. M. Hurst, Prest., The Hurst Automatic Switch Co., 423 Central Natl. Bank Bldg., St. Louis, Mo. Recommended by J. P. Moore and B. W. Frauenthal.

T. J. Powell, Manager, Galena Signal Oil Co., Railway Exch. Bldg., St. Louis, Mo. Recommended by C. B. Shaver and C. E. Teel.

Wm. D. Shermer, Traveling Towerman, T. R. R. A., 3638a Blaine Ave., St. Louis, Mo. Recommended by F. E. Bentley and B. W. Frauenthal.

THE PRESIDENT: Gentlemen, you have heard the names read by the Secretary; if there is no objection, they will take the usual course. It is so ordered.

The proceedings will be published during the summer period; any member desiring to bring any subject before the Club, if he will get in touch with the Secretary, we will be glad to take it up at the Executive Committee meeting; the Executive Committee will meet during the summer and consider any matters that may come before it.

This being the last regular meeting before the summer vacation, you will be duly notified of the next meeting by the Secretary.

If there is nothing further, we will now stand adjourned until our next regular meeting in September.

DIED

BARNEY H. SANDERS

MAY 20, 1917.



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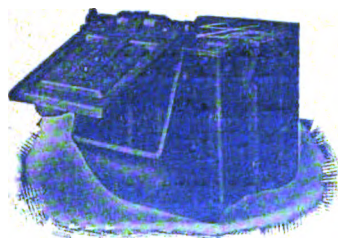
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ST. LOUIS RAILWAY CLUB.

AUGUST 15, 1917.

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VOLUME XXII. Containing paper on "American Railways and the War,"
NUMBER 4. by Mr. Samuel O. Dunn, Editor of the Railway Age
Gazette, Chicago, Ill.

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A. L. POLLARD, Agent, Mobile & Ohio Railroad, East St. Louis, Ill.

The regular monthly meeting of the St. Louis Railway Club was held on Friday evening, October 12, at The American Hotel Annex, at eight o'clock, P. M.

Owing to the fact that the address of the evening was to be delivered by Dr. M. E. Pennington, Chief of the Food Research Laboratory of the U. S. Department of Agriculture, on a subject of great interest to the women of St. Louis interested in the matter of food conservation, the audience was largely composed of members of the Women's Central Committee on Food Conservation for Missouri, who had accepted the invitation of the Club to attend the meeting.

While the large audience was assembling, and prior to the calling of the meeting to order by President O'Brien, a most pleasing musical programme was tendered the members and guests of the Club by the following artists:

Miss Josephine Max, Violin, Mrs. Bothwell, accompanying; Miss Florence Barton Taber, soprano, Mrs. Gibson, accompanying.

The assembly hall was tastefully decorated in National colors, testifying to the spirit of devotion to National ideals which has always been one of the outstanding and characteristic features of the St. Louis Railway Club.

The meeting was called to order by President M. O'Brien, the following being present:

Ahrens, A. J.	Breed, A. C.	Donovan, W. T.
Alsmeyer, Wm. E.	Bremer, R. C.	Eddie, B. F.
Aud, John	Brooks, W. E.	Einstein, R. E.
Ballard, John O.	Burlingame, Chas.	Ellis, Robert G.
Barnard, W. F.	Burns, J. W.	Englemann, Geo.
Bass, Mrs. Geo. A.	Bury, R. F.	Feickert, L.
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Bentley, Mrs. F. E.	Carthans, Wm. F.	Fitts, H. E.
Bischoff, J. M.	Colby, B. H.	Frank, A. A.
Blatner, Mrs. W. D.	Corby, W. E.	Frauenthal, B. W.
Blesch, F. K.	Croft, F. A.	Gantner, Wm.
Booth, J. W.	Deaver, R. H.	Gellhorn, Mrs. Geo.
Brase, G. F.	Doering, W. C.	Grayson, F. O.

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Greenman, Mrs. J. M.	Mueller, E. G.	Simpson, Mrs. G. B.
Gradzensky, A. L.	Mueller, Geo. B.	Singer, G. H.
Halbert, M. W.	Mueller, Lloyd	Smith, C. F.
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Heilman, H. N.	O'Brien, Mrs. J. J.	Steinberg, G. H.
Hill, Price	O'Brien, M.	Taber, Florence B.
Hilliar, H. L.	Osborn, Jos. A.	Thomson, Mrs. John
Hippe, Oscar G.	Osborn, Mrs. Jos. A.	Tiemann, Geo. H.
Hogan, B. W.	O'Toole, Greg.	Trent, John H.
Humphrey, Rubens	Pendergast, Edw.	Trier, H.
Hunn, W. H.	Pennington, M. E.	Trobaugh, E. G.
Ivers, Geo. F.	Pfeifer, H. J.	Turner, M. J.
Johnson, F. B.	Pollard, A. L.	Vaughan, James R.
Kelly, H. J.	Remaud, Thos. H.	Wageley, Chas. M.
Knight, T. K.	Roa, Wm. J.	Waters, M. A.
Kolbe, E. A.	Roepke, W. G.	Weller, Frank
Kraus, E. M.	Sachleben, W. H.	Welsch, Chas. A.
Linhardt, John H.	Sanders, J. C.	Welty, D. C.
Lonergan, Edw. J.	Scally, R. M.	Wilson, F. T.
Luyties, D. Reinhard	Schiebe, G.	Winters, L. D.
Mechin, Gus V. R.	Senseney, Miriam C.	Winter, W. G.
Mechin, Mrs. G. V. R.	Shaver, C. B.	

THE PRESIDENT: Members of the St. Louis Railway Club—ladies and gentlemen:

The meeting will now please come to order.

The first order of business is the calling of the roll, which will be dispensed with, everyone present being furnished a registration card which you are requested to sign, so that we will have a full record of the attendance here tonight for our publication.

The next order of business is the reading of the minutes of the last regular meeting, which will also be dispensed with, as every mem-

ber has received a copy of the official proceedings containing the minutes.

If there are no errors or exceptions to be noted, the minutes will stand approved as printed and forwarded.

The next order of business is the election of new members. The secretary has a list of the applications for membership, which has been passed on favorably by the Executive Committee, and is now subject to the action of the Club.

The Secretary will now read the list.

ELECTED TO MEMBERSHIP.

ACTIVE.

H. E. Fitts, Local Freight Agent, Mobile & Ohio R. R., East St. Louis, Ill. Recommended by A. L. Pollard and J. P. Moore.

F. E. Haines, Assistant Superintendent, C., B. & Q. Ry., Beardstown, Ill. Recommended by T. K. Knight and A. G. Smart.

A. W. Johnson, Special Accountant, Terminal R. R. Ass'n, Room 111, Union Station, St. Louis, Mo. Recommended by B. W. Frauenthal and J. P. Moore.

John A. Mawrry, Train Master, St. Louis, Troy & Eastern Ry., 714a St. Clair St., East St. Louis, Ill. Recommended by C. B. Shaver and M. Marea.

J. L. Meador, Traveling Auditor, M. & O. R. R., Meridian, Miss. Recommended by E. A. Schrader and A. L. Pollard.

R. W. Metzger, Chief Clerk to Genl. Supt., St. L. T. & E Ry., Edwardsville, Ill. Recommended by C. B. Shaver and M. Marea.

Harold J. O'Brien, Accountant, Terminal R. R. Ass'n, Room 111, Union Station, St. Louis, Mo. Recommended by B. W. Frauenthal and J. P. Moore.

E. H. Peck, District Engineer, C., B. & Q. R. R., St. Louis, Mo. Recommended by T. K. Knight and W. C. Welch.

H. W. Press, Statistician, Frisco Ry., 3834 Wyoming St., St. Louis, Mo. Recommended by T. U. Young and H. N. Heilman.

H. R. Redwood, Traveling Auditor, M. & O. R. R., Jackson, Tenn. Recommended by E. A. Schrader and A. L. Pollard.

John P. Reese, V. P. & G. M., C. & N. W. Ry., Coal Properties, 5614 Waterman Ave., St. Louis. Recommended by G. F. Brigham, Jr., and H. J. Pfeifer.

Jas. J. Roche, Purchasing Agent, United Railways, St. Louis, Mo. Recommended by M. O'Brien and J. P. Casey.

J. D. Watson, Asst. to President, St. L. S. W. Ry., Railway Exchange Bldg., St. Louis. Recommended by C. D. Purdon and F. A. Johann.

ASSOCIATE.

John P. Dolan, M. M., National Stock Yards, National Stock Yards, Ill. Recommended by M. Marea and S. M. Dolan.

A. R. Fathman, Secretary Western Tie & Lumber Co., 905 Syndicate Trust Bldg., St. Louis, Mo. Recommended by T. A. Nixon and H. N. Heilman.

Nic LeGrand, General Sales Agent, St. Louis Car Co., 8000 N. Broadway, St. Louis. Recommended by M. O'Brien and B. W. Frauenthal.

Oscar Leistner, Draftsman, American Brake Co., 4533a Athlone Ave., St. Louis. Recommended by S. J. Struben and Oscar E. Vitt.

L. G. C. Mayer, Draftsman, American Brake Co., 4440 Delmar Ave., St. Louis. Recommended by Oscar E. Vitt and Edwin Moody.

Louis Nolte, Comptroller, City of St. Louis, City Hall, St. Louis, Mo. Recommended by B. W. Frauenthal and Henry W. Keil.

E. P. Stanton, General Sales Manager, Lumaghi Coal Co., 606 Equitable Bldg., St. Louis, Mo. Recommended by G. F. Bingham, Jr., and H. J. Pfeifer.

P. R. Walsh, President, Walsh Tie & Lumber Co., 1002 Title Guaranty Bldg., St. Louis, Mo. Recommended by G. F. Brigham, Jr., and H. J. Pfeifer.

THE PRESIDENT: Gentlemen, you have heard the reading of the names of applicants for membership in the St. Louis Railway Club; what is your pleasure?

On motion of Mr. A. L. Pollard, duly seconded, the Secretary was authorized to cast the ballot of the Club in favor of the gentlemen whose names appear above.

THE SECRETARY: The ballot is favorable, Mr. President.

THE PRESIDENT: Gentlemen, the Secretary reports a favorable ballot, and the gentlemen whose names you have just heard read are now duly elected members of the St. Louis Railway Club.

The next order of business is the report of committees. There is a report due from the Executive Committee. The only matter to be reported upon at this meeting is the question of the continuation of our student's studies at Washington University. As explained at our last meeting, the Club's student has been called in the draft of the Federal army; but up to the present time, his number has not been reached. By the action of the Executive Committee at its meeting tonight, the matter was referred to the President and Secretary for final action.

The student's number is a high one, and if his calling is delayed until spring, it will enable him to conclude the second semester of the present school term, in which case he will be awarded his diploma. His number, as I say, being a high one, we are assured on competent authority, that he will hardly be called at present.

Another matter which the Executive Committee disposed of at the meeting this evening was the question of filling ranks now depleted by those serving under the flag in various branches of the military service. Every member of our Executive Committee pledged himself to bring in no less than ten applications apiece, and while I know every member of the Executive Committee will carry out his pledge, and in a great many cases, exceed the promised number, it occurs to me that the membership at large should take advantage of this opportunity, and the fact that a large number of new members is always wanted in this Club, to make the Club the largest in membership in the United States, which goal we expect to reach before the end of this term.

The next order of business is the reading of communications. Are there any communications to be read Mr. Secretary?

THE SECRETARY: No communications.

THE PRESIDENT: Ladies and Gentlemen—As there is no committees to report nor unfinished business, in passing to the next order of business I want to say that it is our great honor to number among our attendance this evening a number of ladies who are prominent workers

in connection with one of the greatest problems that we have before us today—the conservation of our food supply. It would have been a pleasure, indeed, if we had been enabled to extend to the wives and daughters of our members an invitation to attend this meeting, but having in mind our inability to properly accommodate them, we were obliged to deny ourselves this pleasure. We extend a cordial welcome to the ladies present with us tonight, and I will now ask Mr. Herman Pfeifer to introduce the speaker of the evening.

MR. HERMAN J. PFEIFER, (Terminal R. R. Ass'n, St. Louis.): Mr. President, ladies and gentlemen: At our last meeting, Mr. Aish-ton, President of the Chicago & Northwestern Railroad made the remark that on the advice of Dr. Pennington, his road appropriated the sum of \$200,000 for improvements in the matter of refrigerator cars in a shorter time than an equal sum of money had ever been appropriated by that railroad.

The question of food conservation is intimately connected with its transportation, and a great deal of our food being of a perishable nature, which must be transported in refrigerator cars, makes the consideration of this subject a very vital one at this time. The subject, therefore, about which Dr. Pennington is to speak, namely the ability of refrigerator cars to transport perishable products safely, is one of vital interest, under present conditions.

Dr. Pennington is recognized throughout the country as an authority on food conservation and preservation, and it now gives me great pleasure to introduce to you Dr. M. E. Pennington, Chief of the Food Research Laboratory of the United States Department of Agriculture. (Applause.)

THE ABILITY OF REFRIGERATOR CARS TO CARRY PERISHABLE PRODUCTS.

By DR. M. E. PENNINGTON, Chief Food Research Laboratory, United States Department of Agriculture, Bureau of Chemistry, Philadelphia, Pa.

Mr. President, members and guests of the St. Louis Railway Club:

It is with a great deal of embarrassment that I undertake to address you railroad men upon a subject dealing with facts with which so many of you are already well acquainted.

The responsibility of appearing before you is great, dealing, as I shall, with matters which are of daily occurrence in your own line of business, and inasmuch as I come here, talking to you in your own bailiwick, the only excuse that I can plead is that we are at war, that we need food, and that food must be saved. Anything that we can do to save the chicken, the egg, the fish, no matter to how small an extent, we must do, as a part of the work that we all have in hand, to the end that we may win this war.

If I can do just a very little bit by placing before you some of the results of the investigations of the Department of Agriculture in the matter of saving foodstuffs, I will be more than glad, and I know that you, as patriotic American citizens, will rejoice, also.

We are being daily more and more impressed with the evidence to show that this war will be won by food.

The task of feeding the Allies and ourselves becomes more important as it becomes more difficult. The President urges increased production and agriculture is fostered as never before—yet we know that the calling of men to the colors and to the many activities of war means greater and greater difficulty in the production of the foodstuffs necessary to win the war. Therefore, conservation and the elimination of food waste and spoilage has become a world question of vital interest.

The question of transportation has also become of overwhelming importance. Our railroads are taxed to their utmost, and, as in the food question, the future seems to hold problems even harder to solve than those now at hand. Every rail, locomotive and car must be utilized for maximum service. The refrigerator car, especially, becomes an object of renewed interest because upon it depends very largely our ability to render available the crops produced and food animals raised. It must carry a full load, yet we must not, in our zeal to transport perishables, permit any spoilage or damage in transit that can possibly be avoided.

The investigation of the transportation of perishables which is now under way in the United States Department of Agriculture has shown that the refrigerator equipment on the various lines differs widely in ability to protect against heat and cold. This variation depends to a certain extent upon the size and character

of the load as well as upon the construction of the car. It is my purpose to discuss with you some of the results of these investigations, comparing the performance of cars of varying types when loaded with varying quantities of the commodity to be transported. First, however, let me very briefly outline the major differences in the construction of the cars used in these experiments. In the general purpose refrigerator car we find two types of bunker—one known as the "box bunker," illustrated in Fig. I, in which the ice

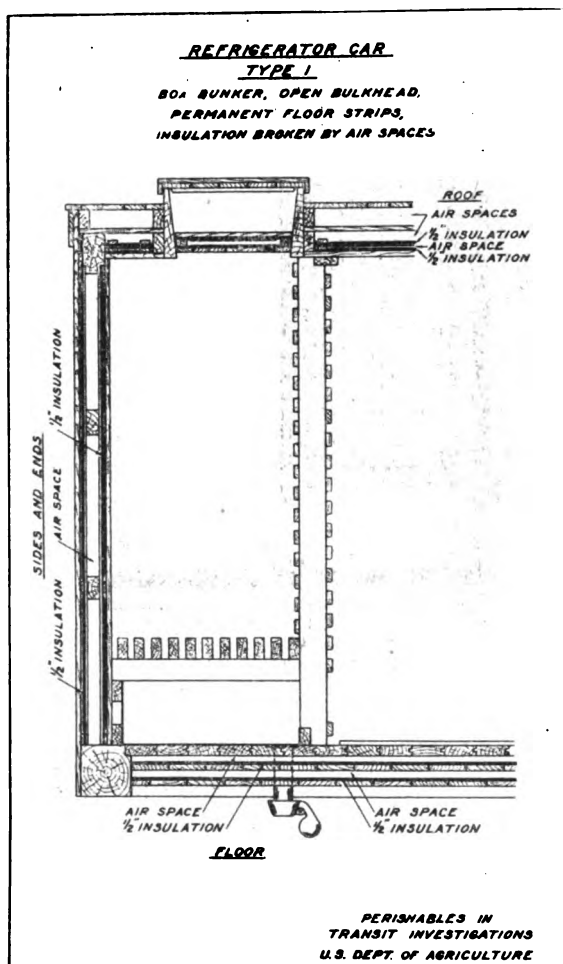


Figure 1.

rests directly against the end and sides of the car—and the other, known as the “basket bunker,” in which the ice is held in a wire container two inches away from walls and bulkhead (see Fig. II).

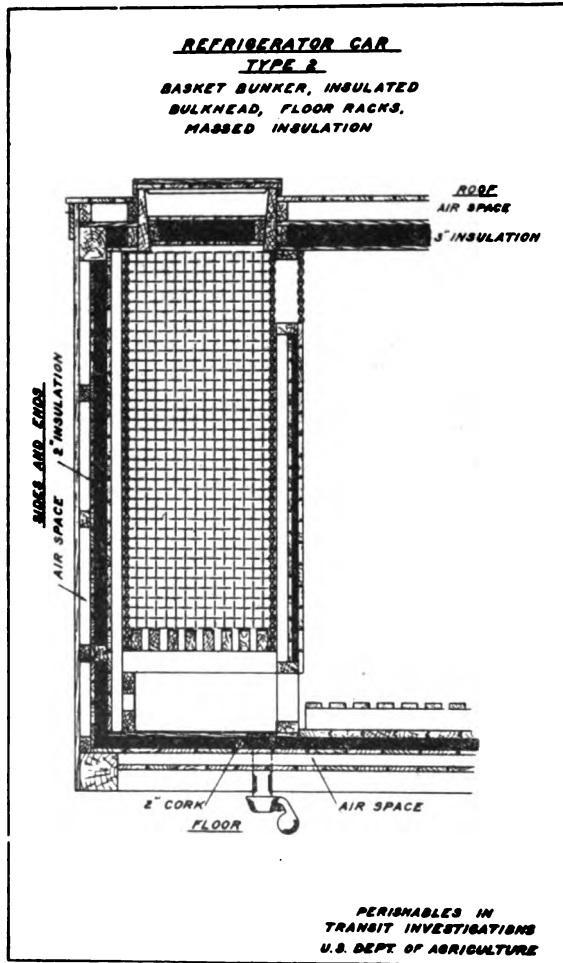


Figure II.

The box bunker usually has an open bulkhead of wood or metal. Sometimes we find a solid wooden partition open at top and bottom. The basket bunker commonly has a solid, wooden bulkhead, open twelve inches at the bottom and fourteen inches at the top, and in

the new cars this bulkhead is insulated with one inch of a recognized insulator. The new cars, also, have a rack, on the floor, four inches in the clear, made of 2x4 runners and 1x3 cross slats, 1½ inches apart. These racks are fastened to the sides of the car with hinged bolts. They are divided in the middle so that they can be turned up against the walls when the car is cleaned. They are absolutely necessary for the safe carrying of perishable loads. Most of the cars now on the lines are without racks. Some have permanent strips on the floors one or one and one-half inches in height. These strips are practically valueless. The insulation varies from a few layers of paper to three inches of some recognized insulator. In some cars the layers of insulation are broken by spaces—in others the insulation is massed. The cars in the experiments were from approximately twenty-nine feet between bulkheads to approximately thirty-three feet.

The majority of the experiments used as illustrations are taken from the investigations on the transportation of eggs, because that field of work is under my charge. Whenever the shipment of fruits or vegetables is used to emphasize a fundamental the facts have been furnished me by Mr. H. J. Ramsey, of the Bureau of Plant Industry, under whose direction all such commodities are being investigated. Of course, all temperatures were taken by means of electrical thermometers inserted when the cars were loaded and the mechanism was such that neither the doors nor the hatches were opened to take records nor was the car modified in any way.

Now let me proceed to the work done by such classes of cars as above indicated.

The car factors which determine the size of the load which can be safely carried are insulation, bunkers and floor racks. Each exercises a specific influence as indicated in Chart I. This experiment consisted of three cars which had been in experimental service for about ten months. As shown on the chart, cars A and C were provided with basket bunkers and floor racks; car B had a box bunker and strips on the floor. Cars A and B had three inches of insulation in the roof, two inches in side walls and ends and two inches of cork in the floor. Car C had one and one-half inches in the walls and two inches in the roof and floor. Each was loaded with six hundred cases of eggs consolidated from pickup cars, and

45.5° F. and car A, 44.5° F. The packages between the doors on the top of the load—in this case five layers high—showed for car B, 64°, for car C, 56.5°, and for car A, 55.5° F.

The behavior of the packages on the floor of car B between the doors is especially noteworthy. They were continuously higher in temperature than the packages on the top of the load, a condition

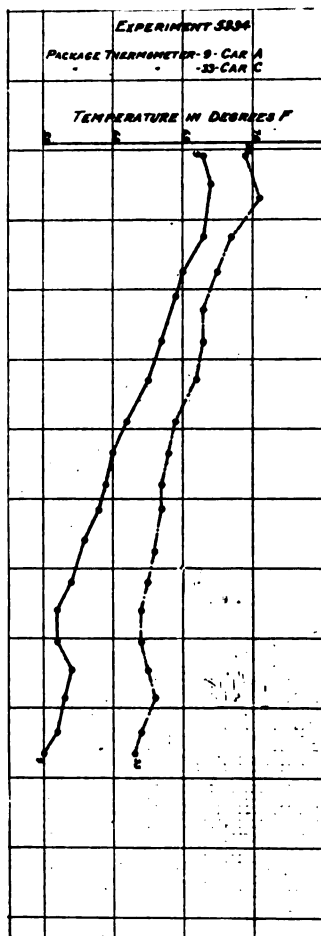


Chart II.

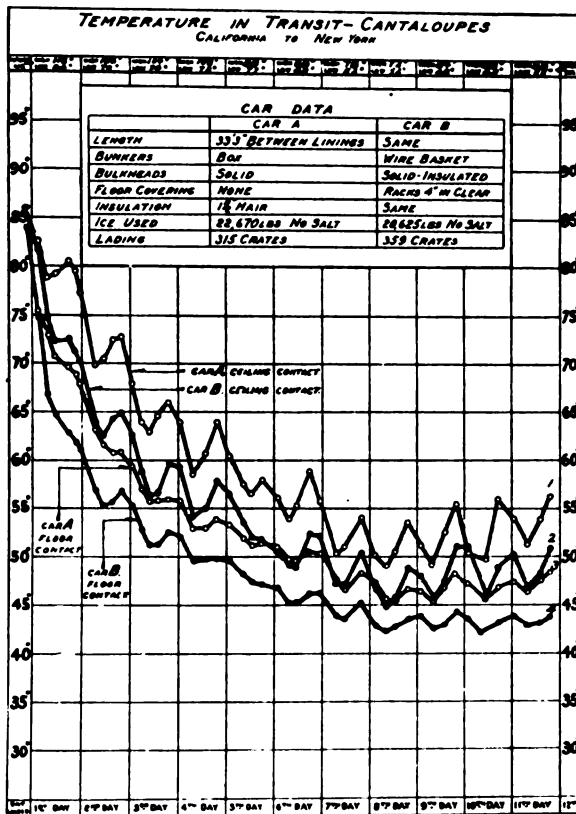
quite contrary to the generally held idea that the coolest place in a refrigerator car is its floor. That is only true when the construc-

tion is such that the cold air from the bunkers can travel along the car floor. This experiment, and many others that we have made, show conclusively that a rack 4 inches above the floor is necessary if the goods on the bottom of the load in the two middle quarters of the car are to be refrigerated. It is of interest to note, also, that the insulation in cars A and B is unusually heavy, in fact, more than twice as much as is in most of the refrigerator cars now in service, yet because of the construction of the bunkers in car B and the absence of a rack on the floor, there was practically no refrigeration except near the bulkheads.

Manifestly, car B is not a satisfactory carrier for a heavy load of eggs. Car A, on the other hand, has done its work well, and at first sight car C, having less insulation, appears to be efficient for a load of 600 cases of eggs during hot summer weather. Further study, however, shows that the packages around the walls of car C came into destination over 6° higher than the corresponding packages in car A (Chart II), though when loaded, they were but 3° apart.

Car C used about 1,000 pounds more ice than car A and, on the whole, did less satisfactory work, especially around the walls, where actual deterioration due to heat undoubtedly occurred.

It may be said that in the experiment cited car B, having the box bunker and open bulkhead, was unfairly treated in that the temperature of the entering load was distinctly higher. The facts illustrated in Chart III tend to nullify the significance of such an argument. In this experiment, the cars had two inches of insulation throughout, but car A was of the box bunker type, while car B had a basket bunker and its adjuncts. Here the eggs entering car A were cooled to between 50 and 60°, while those in car B ranged between 55 and 65°. However, car A could not even maintain the initial temperature. At destination the packages in the middle of the car on the floor were nearly five degrees warmer than when they entered the car and those in the top layer were over 2° F. higher. Car B, on the contrary, brought in the load from 6 to 14° lower than car A. These two cars were loaded with 600 cases of eggs and, so long as the atmospheric temperatures were above 80° F., refrigeration was of doubtful efficiency. The third and fourth days of the trip were unseasonably cool and also rainy, which



six wide and four high at the bunkers, was in such bad condition on arrival that claims were filed for damage in transit. Car B, on the other hand, was in good condition, although the load was seven cases wide and four cases high. In car A the combination of a lack of cold air circulation and of insulation proved disastrous, even though the load was light and open in character, and much easier to refrigerate than a load of eggs. In fact, we know that eggs can not be safely loaded more than three layers high in summer weather in cars having one inch of insulation. Cars having one and one-half inches of insulation, if provided with a basket bunker and a floor rack, can carry four layers. To load five high, we must have three inches in the roof and two inches in walls, ends and

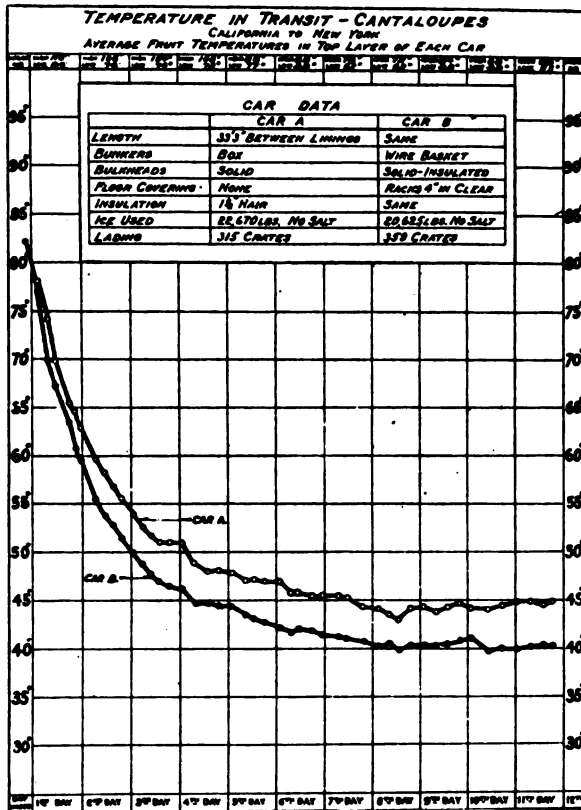
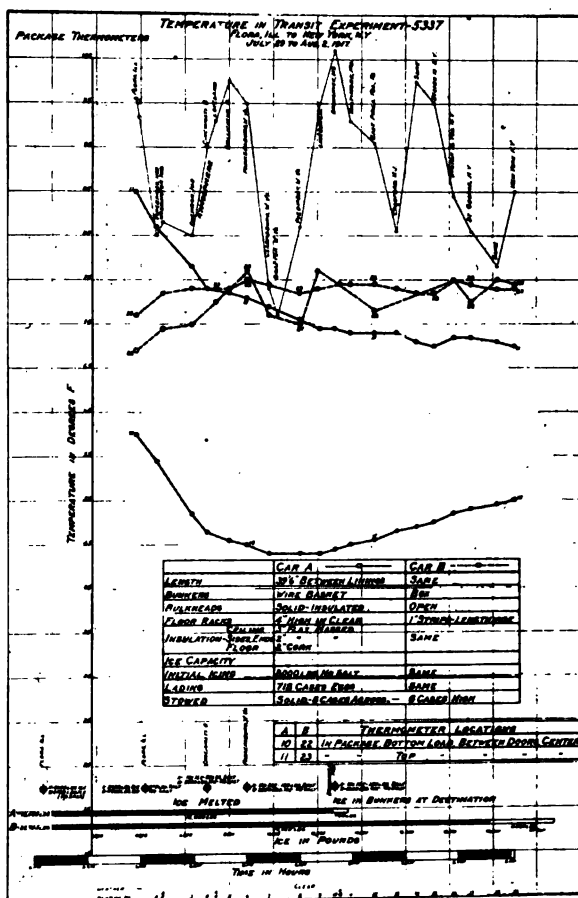


Chart V.

floors, and good air circulation. Beyond five layers of egg cases we have not succeeded in getting good refrigeration.

This is illustrated in Chart VI, showing top and bottom layer temperatures in two cars stowed six layers high, making 700 cases to the load. Car A is of the same type as was used in Chart I, where with 600 cases it did good work. With 700 cases there was practically no refrigeration except in the bottom layer. The companion car, B, with the same insulation but having a box bunker, did not even refrigerate the lower layers. The packages on the floor, middle of the car, were often warmer than the top of the load, which was only 12 inches from the ceiling. It varied more than five

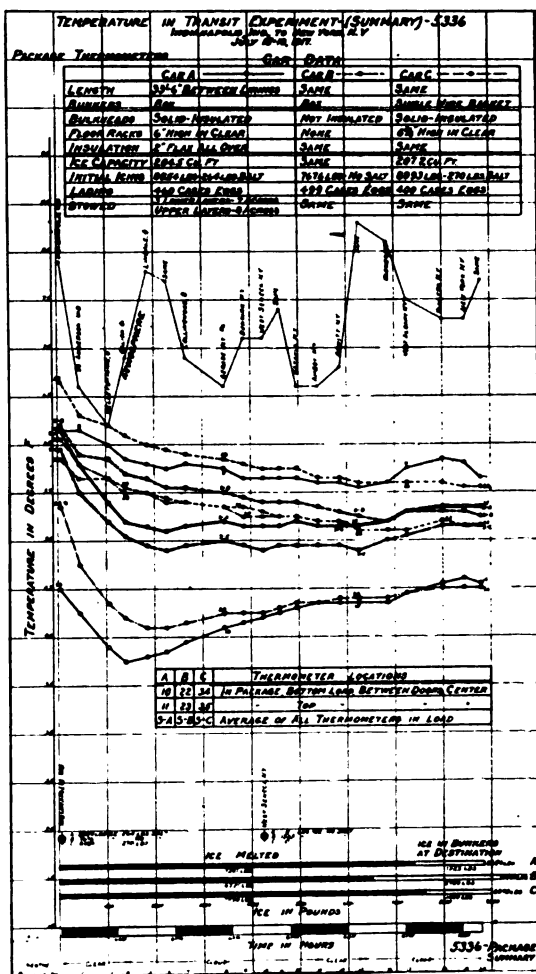


The insulated bulkhead also protects the load so that frosting does not occur. Salting ice in a box bunker, open bulkhead, merely freezes the load next to the bulkhead. The packages in the middle of the car are not benefited because of a lack of air circulation.

We have used salt to assist in refrigerating heavy loads of eggs and with some success, but we have not succeeded in refrigerating 700 cases in a car 33 feet between bulkheads. The records of car A, in Chart VI, bring out this fact. Three per cent of salt was added after the load had been placed in this car and salt was again put into the bunkers at three icing stations. While the car was not able to handle so heavy a load during the very hot weather prevailing, it nevertheless did rather remarkable work and furnished valuable information on which to develop a more economical and efficient icing system. Car A, which brought the sixth layer of eggs from 85° down to 66.5, used 12,660 pounds of ice and 540 pounds of salt; car B, which did not refrigerate either the top or bottom of the middle part of the load, used 19,755 pounds of ice.

A great many experiments have been made with fruits and eggs, all of which confirm the foregoing; namely, that a suitable use of salt saves ice on a long haul and greatly increases the efficiency of the work done on both short and long hauls.

The experiment recorded in Chart VII adds still further to our knowledge of car construction and car performance when salt is used with the ice. In this case we had short cars, so that by comparison the two inches of insulation became nearly 2.5 inches, and the air circulation was more rapid because of lessened distance. Car B was of the usual box type; car A had a box bunker with an insulated bulkhead and a floor rack; car C was of the standard basket type. Cars A and C received salt on the initial icing. They were neither iced nor salted in transit on an 88-hour haul. Car B was iced once. All contained from 400 to 500 cases of eggs. The three lower layers were seven cases wide, spaced for air circulation, and the upper layers were eight cases across. The average of all the thermometers in the packages in various parts of car B showed that it was far above cars A and C until the last day of the trip. An analysis of temperatures in different locations shows, further,



that the floor of car B paralleled the top layer of car C. Car C did much the best work of the three. Car A, having the rack and the insulated bulkhead, but not the basket bunker, did not succeed in maintaining a sufficiently rapid air circulation to cool the top layer more than 5° . The packages on the floor, on the contrary, were exaggeratedly chilled because of the pocketing of the cold air. The conclusion follows that even with an openly stowed load, the car must be provided with a basket bunker, an insulated bulkhead,

stopping point. The fifth layer cases around the walls of the car would suffer if the weather were hot, if salt were not used. With the salt, as this experiment shows, we can load five high with impunity, but not six, because of damage to wall cases. A study of the chart shows that the 40 pounds of salt added at the first icing station was enough to cause a drop in temperature in all except the sixth layer wall packages. Had another charge of 40 pounds been added the next day, the rise shown in the lower layers would have been avoided and the fourth and fifth layers would have continued to cool instead of remaining practically stationary.

The investigation has convinced us that in the future ice and salt will be used for more commodities than fresh meats, poultry and fish. Indeed, it is the only way that we now see by which very perishable small fruits can be transported in good condition throughout the entire car. Of course, a definite routine for its application must be worked out. The experiments of the summer just ending have yielded much information. We hope that by the end of another summer we can bring you specific instructions for a number of commodities.

Such instructions must, however, be based on the type of car used. Far too many cars now on our lines would be useless no matter what treatment they received. For example, we still have cars with one-half inch of some insulator posing as refrigerators, and we still have cars, the walls of which contain only paper and air spaces. Considering the relation of foodstuffs to the winning of this war, I cannot look upon the use of such cars to transport perishables as anything short of a wasteful practice, and should be discontinued.

Look at Chart IX. One of the cars represented is of the paper variety—the other well insulated. There is a variation of more than 15° between the two cars. The floor of the one is often six or more degrees warmer than the ceiling of the other. The paper car follows the atmospheric temperature and the refrigerant in the bunkers is almost powerless. Yet again and again this summer eggs, fruit, vegetables and dressed poultry have been shipped in these cars and sometimes they have been loaded almost to their cubical capacity!

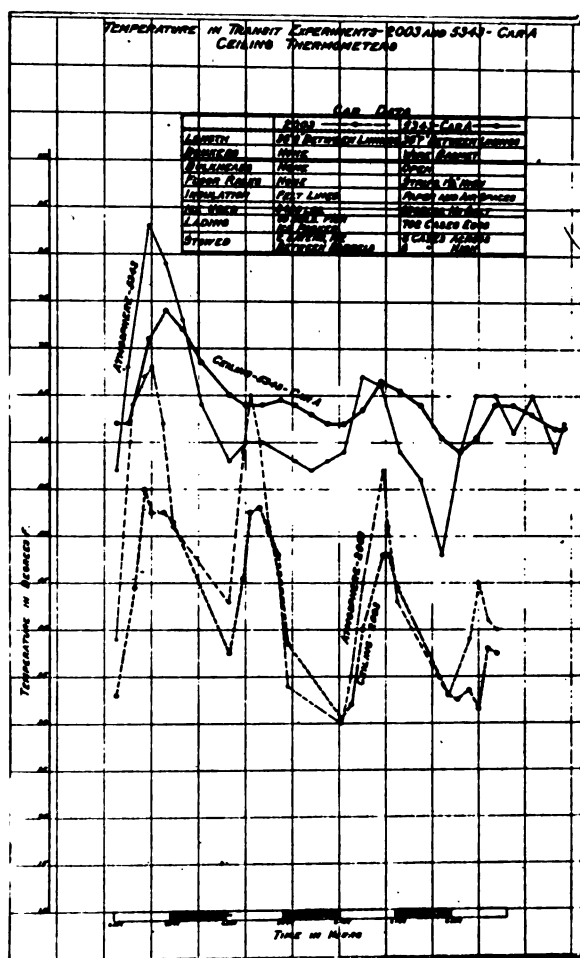


Chart X.

that of the paper car on the same chart and I think you will agree with me that there is a decided similarity between the two.

Summary.

Summing up the results of such experiments as these we are led to the following conclusions:

1. A combination of basket bunker, insulated bulkhead and

floor rack, produces a circulation of air which is not obtained in a car having a box bunker, open bulkhead and bare floor or permanent strips.

2. Such a basket bunker car, approximately 33 feet between bulkheads, can refrigerate the top and bottom of the load in the two middle quarters of the car, provided it is sufficiently well insulated and not overloaded.

3. Cars which depend for insulation on paper and air spaces should not be used for the transportation of such perishables as fruit, delicate vegetables, poultry, eggs and fish.

4. Cars having one inch of insulation will not carry eggs successfully during hot weather when loaded more than three layers high.

Cars having one and one-half inches of insulation in the side walls and two inches in the roof and floor will not carry eggs successfully during hot weather when loaded more than four layers high.

Cars having three inches of insulation in the roof, two in the side walls and ends and two inches of cork in the floor will carry eggs five cases high, but not six.

The box bunker car, regardless of quantity of insulation, does not refrigerate the two middle quarters of the load when it is tightly stowed. Even with an open load the performance is unsatisfactory.

5. The use of salt with the ice in a well insulated basket bunker car will permit an increase in the load of from 25 to 40 per cent.

6. While each commodity must be studied separately in order to determine the maximum load, the principles of the relation between car efficiency and tonnage of eggs as indicated in this discussion can be applied to perishables in general.

We are continuing, of course, such work as I have outlined to you this evening; it will be a long study before all of the many questions which have come to your minds, and which have come to our minds can be answered. It is only by co-operation of the railroads and the

shippers that we can come anywhere near solving the many questions that we will have to answer. You railroad men have abundantly furnished the co-operation, and we of the Department of Agriculture feel ourselves very greatly your debtors.

If we can be of any further service to you, please call upon us. We want to be of service, of course; that is what the money is appropriated for, and that is what we are all working for.

If I can answer any questions, now, I will be very glad of an opportunity to do so. (Applause.)

THE PRESIDENT: Ladies and gentlemen, you have heard Dr. Pennington's most interesting and scientific address, which is now before the Club for discussion.

We desire that all of those interested ask Dr. Pennington questions, especially the mechanical men who are here, and I think we are all satisfied in advance that your questions will be answered intelligently and accurately. We would like to hear from some of those who are present.

MR. B. H. COLBY (Consulting Engineer, St. Louis): Mr. President, I think we have all realized from Dr. Pennington's talk the very great necessity of producing circulation in cars used for the transportation of foodstuffs, so as to have the same temperature in all parts of the car—is that right, Dr. Pennington?

DR. PENNINGTON: Producing a circulation—yes.

MR. COLBY: Yes. Now, if you will pardon me, it seems to me as an engineer, that it is a very simple problem to produce mechanical circulation, and an even temperature in all parts of a car, regardless of the height of the load, with the use of fans. I have made experiments along that line, myself, in rooms, and I know that in a very short time you can have the same temperature in every part of the room, by putting in fans—producing a mechanical circulation.

DR. PENNINGTON: Where will you get power for your fan?

MR COLBY: You can easily have a dynamo on the railroad train.

DR. PENNINGTON: Getting power from the axle?

MR. COLBY: Certainly.

DR. PENNINGTON: When your car is idle for sixteen hours on a stretch, what are you going to do in that event?

MR. COLBY: Then you would have to have a gasoline motor.

DR. PENNINGTON: And who will take care of that?

MR. COLBY: The gasoline motor? That could be easily taken care of; in any event, it would be very poor railroading to allow trains to be idle for sixteen hours at a stretch.

DR. PENNINGTON: Nevertheless, they do it—and I don't think it is a very poor railroad that does it, either.

THE PRESIDENT: We would like to hear from some other mechanical man, now; I know it will please Dr. Pennington to have us bring out as much discussion on this subject as we possibly can. She has come a long distance to address us this evening, and we certainly want to hear from all of you.

I will call upon Mr. John O'Brien; he can possibly give us some information on this subject.

MR JOHN J. O'BRIEN (Supt. Car Dep't T. R. R. A.): Mr. President, I hardly feel capable of saying anything on this subject; unfortunately we have not here this evening very many refrigerator people. As we all know, we have here in St. Louis the A. R. T. and the St. Louis Refrigerator Co. and they ought to be represented here.

However, I fully realize that the natural circulation of air is essential, whereas mechanical circulation is not a feasible thing, at all. I do not believe any mechanical appliance would meet the requirements.

THE PRESIDENT: There are some mechanical men in the room

whom we would like to hear from. I am satisfied that there are many questions Dr. Pennington can enlighten us on, if you can just think of something to ask her; she is here for that purpose.

MR. PFEIFER: Dr. Pennington, would it be possible to put in an air space on the inside of the car, say by means of furring strips, or something of the kind, so as to get away from the excessive heat next to the walls of the car?

DR. PENNINGTON: A space, do you mean, between the walls of the car and the inside?

MR. PFEIFER: Yes, between the load and the side of the car.

DR. PENNINGTON: Yes, it is,—except that you, by that means, decrease the loading space just that much.

In the winter time, in order to protect against freezing, they put racks around the walls of the cars, as well as on the floor, to destroy actual contact between the packages and the car wall, and thereby you get run-away for the heat. The proposition is perfectly sound; however, it does reduce the loading space.

MR. PFEIFER: I thought you might gain in height what you lose in width.

DR. PENNINGTON: Well, sometimes you do, but then, you have to also maintain the rack on the walls, which is not an easy thing to do—it is not impossible, but it does require a certain amount of labor to maintain the rack on the walls, as well as on the floor. We have had to do a good deal of arguing with the railroads to get them to put the rack on the floor. I think we had better educate them a little further before we propose the rack on the side walls.

THE PRESIDENT: We have some gentlemen here from the Lemp Brewing Co. We would like to hear from them. Is Mr. Feickert in the room?

MR. LOUIS FEICKERT (Traffic Mgr. Lemp Br'g Co., St. Louis):

Mr. President: I would like to hear from some of these other gentlemen on this subject. The shipping that we do is an entirely different line of shipping from the shipping of eggs and poultry; under the circumstances, I would be hardly competent to talk with respect to that mode of refrigeration.

THE PRESIDENT: Probably some of the ladies would like to ask for some information on this subject. We would like to hear from them as well as the gentlemen.

Can we hear from Mrs. Gellhorn?

MRS. GEO. GELLHORN (President St. Louis Food Conservation Society): Mr. President—I am only going to speak for Mr. Bush, because he is afraid. (Laughter.)

Mr. Bush wants to know what they are doing with liquid air; are they using, or are they going to make use of liquid air in our refrigeration schemes?

DR. PENNINGTON: In refrigerator cars?

MRS. GELLHORN: Yes.

DR. PENNINGTON: I think that is very doubtful. In the first place, it would be so extremely difficult to carry that we would have a great deal of trouble, and then the arranging of the cars for liquid air would be very expensive. I think the expense of charging the cars would be prohibitive. At the present time, at least, so far as we can see, it would not be practical. It is difficult to say what use we shall make of liquid air in the future. Perhaps some day we may be able to use it as a refrigerant; at the present time, at least, we do not find anything as economical as ice.

The question of mechanical devices—little refrigerating machines—to cool the cars, etc., is a very interesting one, and theoretically, these things are all highly desirable; practically, however, we have not so far been able to make them work, simply because they are not “fool-proof”—and they all require man-power continually.

You know it is getting more and more difficult for us to supply

the absolutely necessary number of employees on railroads, and it does not seem wise to deliberately add mechanism which would require skilled labor to maintain.

The gasoline engine is fool-proof up to just a certain point, and then it does require attention; unfortunately, it happens that that point beyond which it is fool-proof is ordinarily the point at which damage may be done by incompetent handling of the engine. Ice, on the other hand, very largely takes care of itself, with an economical amount of labor attached, so, for the present, at least, we are clinging to ice.

MR. PFEIFER: I would like to ask as to the ice consumed on these cars of which you have made comparisons. Which cars consumed the most ice on those trips—the ones that did the work well, or those that did not?

DR. PENNINGTON: By and large, the ones that did not do the work well used the most ice.

It depends a great deal on the length of the haul. We find that a car which cools its load quickly—brings the load down to a temperature which the car can maintain—uses, after that point, a very small amount of ice, if it is well insulated. The car which does not cool its load, which has the ice directly in contact with the side walls and ends, uses more ice; many times on a short haul, they use more ice. The car which is better insulated, of course, uses less ice; for instance, in this experiment which is shown in chart No. 1, the car which had $1\frac{1}{2}$ inch side walls, that car used about 1,000 pounds more ice than the car which had 2 inches in the side walls, referred to here—and did not do the work as well.

Here is another instance of a car that did the best work, using 11,000 pounds of ice, while a car which did practically no work at all, used something over 19,000 pounds of ice. That is, there was that much ice actually melted, with very little refrigeration to show for it.

In another experiment, where we had some salt in the car which did some work on a load which was too high—that was in a box bunker car—it used 19,725 pounds of ice, and in the basket bunker 12,600; you see, the basket bunker car maintained its equilibrium;

then, the ice meltage is very little, where the haul is long. A basket bunker car can be depended upon to use 2,000 pounds less for each four days of haul.

MR. B. W. HOGAN (Foreman M. R. T. & T. Co., St. Louis): Does this complaint apply only to the shipment of eggs? Is there no complaint about packing-house products?

DR. PENNINGTON: Packing-house products are very largely shipped in cars belonging to the owners of the packing-houses.

MR. HOGAN: Are they not all constructed the same, generally speaking, as these refrigerator cars which are used almost universally?

DR. PENNINGTON: Oh, no; meat cars, as they are called, are constructed with tanks—they have galvanized iron containers; ordinarily there are four in each end of the car.

MR. HOGAN: It would seem as though all the trouble were just with eggs; I thought probably something else would come into that.

DR. PENNINGTON: No,—the trouble, unfortunately is not only just with eggs. There is trouble with all classes of commodities that we are hauling. You understand, I have used eggs as an illustration here tonight, as I stated at the beginning of my talk, because I could make comparisons more readily. But we have fruit deterioration, as in the case of cantaloupes; we have meat deterioration, and we have deterioration of practically every perishable product that is hauled, if the car is not adequate to take care of it—especially if the car is overloaded.

THE PRESIDENT: Mrs. Gellhorn, can we not hear further from you?

MRS. GELLHORN: Mr. President: I think that one of the most important things that the St. Louis Committee on Food Conservation wishes is that someone would endow us with enough money, if that were possible, to keep Dr. Pennington here to tell us more about these matters.

Our trouble is that all of this is almost beyond us. Now, if someone would only reduce it into terms of one dozen eggs, instead of the vast quantity contained in a refrigerator car, it would come nearer to our comprehension, and we could understand it better. Our present trouble is that we feel we are such very small pebbles on such a very large beach. (Laughter.)

At any rate, we, in St. Louis, as you know, I hope, are working on the food conservation problem from a local point of view, and we are working at it in all seriousness. We thoroughly appreciate the opportunity we have had of listening to this splendid talk, and we appreciate the fact that you have given us the privilege of sharing with you the information which Dr. Pennington has to impart.

We hope that our vision will grow, and that, sooner or later we will have an opportunity to consider these things from the standpoint of car-load lots. (Applause.)

THE PRESIDENT: I understand the Chairman of the Committee on Education in Food Conservation is present—Mrs. Senseney; we would like to hear from her. (Applause.)

MRS. SENSENEY: Mr. President, and ladies and gentlemen—I feel very much as Mrs. Gellhorn has put it—that we are rather infants in this matter.

I have been very much interested in Dr. Pennington's discussion of this subject. We feel that we are very little, and that we have very much to learn. The main idea of the Educational Department, in all this work, is to bring a realization of the necessity for food conservation into every household in the city of St. Louis, and that particular phase of it is interesting us now.

It is most encouraging to know that a body of men whose efforts in that direction mean so much for the country, is taking the matter so seriously in every detail. I thank you. (Applause.)

THE PRESIDENT: We would like to hear from Mrs. Mechin, Chairman of the Committee on Economics. (Applause.)

MRS. G. V. R. MECHIN: Mr. President, I don't know why you

should call upon Mrs. Mechin unless it is because of the fact that Mr. Frauenthal wished this whole matter on me, when he asked me to give him the names of those interested in this subject, so that he could invite them to be here. (Laughter.)

I think he was just trying to treat me nicely when he just said to the President, "Call on Mrs. Mechin"—I know that because I heard him whispering to the President. (Laughter.) But, now that I have the floor, I am going to keep it, because I have a few things that I want to say.

I am not going to talk about food conservation, because my particular line is the production of food, and I am more active in the matter of gardening, which I feel is a very great element in the matter of food conservation—because if we don't produce anything, you would not have anything to conserve.

I fully sympathize with the one dozen eggs that Mrs. Gellhorn has talked about, when these people are talking about carload lots of food-stuff which are shipped, as compared with the amount of land that is plowed in St. Louis, and the small results that we obtain as a result of it. Of course, I feel that we have a great deal to teach to the people of St. Louis; they can't teach me anything, because I know the game; but what I would like to do is just to get the people sufficiently aroused so that they will do these things, and not say: "Why, yes; it's a splendid thing—go ahead and do it."

That is the trouble with most of you men; when we talk about production, you say: "Yes; that's perfectly fine—go ahead and do it!" (Laughter.) Then you sit back serenely and wait for something to happen.

We women are not at all desirous of providing you men with pillows, because we have to be up and doing, and I am very proud to know that we have one woman with us who has been able to stand up and tell you men so many things,—and there has not been a question asked that she has not been able to answer. (Applause.)

Someone said to me just a moment ago: "Why don't you make these men get up and talk." There's my husband back there, for instance. (Laughter.) I said: "Why, they *can't* talk—they haven't anything to say, and they are ashamed of themselves because they haven't the cars." (Laughter.)

It is going to cost you money to do this thing properly, but you will save money in the end. Think of the claims you are going to save!

The first thing that you railroad men want to do is to get the cars; not say: "It is a good thing" and then let it drop, just because a woman has told you these things. She can't do these things herself, and that is why she is here—because she wants you to do them.

It is the same thing in the matter of gardens. We want the men next year to put in the gardens, you put in the gardens, and then come to us and tell us how much you have raised. You attend to that, and you may trust the women to attend to the matter of conserving what you do raise. (Applause.)

THE PRESIDENT: Is there anything further to be said on this subject? Is there any lady or gentleman present who has anything further to say?

MR. T. K. KNIGHT (C. B. & Q. R. R., St. Louis): I would like to say, Mr. President, that this has been a most delightful and instructive evening.

It is quite a novelty for the St. Louis Railway Club to entertain ladies; generally we have stag parties at our business meetings.

This Club has been addressed by some of the ablest railroad men in this country—and that means in the world. This is the first time we have ever had a woman tell us how to handle our business—and there is no doubt of the fact, gentlemen, that we will have to take off our hats to Dr. Pennington. We have certainly learned something tonight that we never knew before.

I remember when I was switching—and that has been a good many years ago—there was a pretty serious shortage of refrigerator cars; one of the packing-houses wanted a refrigerator car for their meat; I grabbed hold of a St. Louis Refrigerator car and ran it into the packing-house.

Most of you railroad men know the difference between a meat car and a St. Louis Refrigerator car, and you know what a terrible mistake I made. I had been switching quite a long time, and I didn't know any different. I know it now, however.

We have learned a whole lot of things, and we are certainly under great obligations to Dr. Pennington.

I would like at this time to move that the St. Louis Railway Club extend a vote of thanks to Dr. Pennington, and that her remarks be published in the proceedings, including the charts, if they can be reproduced. This address should be read by every railroad man in the country, and it will reach a great many of them, if it is published in our proceedings.

MR. H. W. HUNN (Western Ry. Weighing Ass'n): Mr. President, I take pleasure in seconding that motion; I think the information we have obtained here tonight is such that we should take no chance of losing it or letting it get away from us; and it should be put in such shape that we can get it and read it very carefully; we will know more about the subject after we have done that, when we have had an opportunity to think this matter over a little further. (Applause.)

(Mr. Knight's motion, seconded by Mr. Hunn was unanimously carried.)

THE PRESIDENT: Dr. Pennington, on behalf of the St. Louis Railway Club, I take pleasure in extending to you the thanks of the Club, not only for the long distance you have traveled to come here, but for the very interesting and instructive address with which you have favored us tonight.

MR. M. A. WATERS (Travelers' Co.): Mr. President, in this connection, I would like to make the suggestion that after we have had an opportunity to carefully read over the talk that has been given us tonight, in our proceedings, together with the comments upon it on the part of the various ladies who participated, we will realize that the wonder is not that we have a woman congressman at Washington, but that we haven't a hundred of them. (Laughter and applause.)

MR. A. L. POLLARD: Mr. President, I wish to move that the thanks of the St. Louis Railway Club be extended to the ladies who have favored us with their presence tonight, and who have shared in the discussion of this important subject.

Mr. Pollard's motion being seconded, was unanimously carried.

(Through the courtesy of the Missouri Pacific Railroad, the Club was taken on a tour via the Motion Picture Route through the Royal Gorge of Colorado, which trip, as evidenced by the applause which followed its showing, demonstrated that it was highly appreciated. These pictures were followed by others showing the New Memphis Bridge, the docks and terminals at Westwego, and industrial plants and terminal facilities at New Orleans, La., concluding with a ride through the beautiful Arcadia Valley, on their line just directly south of St. Louis, all of which were greatly enjoyed by all those attending.)

THE PRESIDENT: I feel quite sure everyone has enjoyed the pictures, and on behalf of the Club desire to return our grateful thanks for the consideration shown us, and to Mr. J. W. Booth, Advertising Manager of the Missouri Pacific, through whose courtesy this entertainment was furnished, we tender our sincere thanks.

The next order of business is the reading of applications for membership. The Secretary read the following applications:

APPLICATIONS FOR MEMBERSHIP.

ACTIVE.

J. C. Briggs, Pass. Acct., St. L.-S. F. Ry. Co., St. Louis, Mo. Recommended by Henry Heilman and T. U. Young.

J. C. Chenot, C. C. to Disbursements Accountant, St. L.-S. F. Ry. Co., St. Louis, Mo. Recommended by Henry Heilman and T. U. Young.

W. A. Chittenden, Supt., C. B. & Q. Railroad Co., Beardstown, Ill. Recommended by T. K. Knight and E. H. Peck.

S. Thier Fiero, Chief Mch. Insp., Frisco Railway, St. Louis, Mo. Recommended by Henry Heilman and T. U. Young.

J. H. Halligan, Right of Way Agent, St. L.-S. F. Ry., St. Louis, Mo. Recommended by Henry Heilman and T. U. Young.

J. W. Jamison, Gen'l. Atty. for Mo., M. K. & T. Ry., St. Louis, Mo. Recommended by A. R. Thickitt and B. W. Frauenthal.

G. H. Kersting, Clerk, C. R. I. & P. Railroad, St. Louis, Mo. Recommended by S. E. Nell and J. L. Pearre.

P. A. McLeod, Ass't. Engr. Valuation, St. L.-S. F. Ry., 812 Fairview Ave., Webster Groves, Mo. Recommended by Henry Heilman and T. U. Young.

Edward W. Murray, Field Man Statistician, St. L.-S. F. Ry., St. Louis, Mo. Recommended by Henry Heilman and T. U. Young.

G. H. Russell, Special Accountant, St. L.-S. F. Ry., St. Louis, Mo. Recommended by F. H. Hamilton and Henry Heilman.

Fred M. St. Vrain, C. C. to Freight Accountant, St. L.-S. F. Ry., St. Louis, Mo. Recommended by Henry Heilman and T. U. Young.

ASSOCIATE.

A. J. Ahrens, Clerk, Magnus Company, St. Louis, Mo. Recommended by F. A. Croft and Henry Heilman.

Frank Fisher, Service Engineer, The Pilliod Company, 512 N. Spring Ave., St. Louis, Mo. Recommended by B. W. Frauenthal and M. O'Brien.

A. A. Frank, V. P., Standard Railway Equipment Co., Ry. Exchange Bldg., St. Louis, Mo. Recommended by E. Saxter and J. H. Trent.

Price Hill, Furnace Builder, 515 Merchants' Laclede Bldg., St. Louis, Mo. Recommended by E. A. Kolbe and B. W. Frauenthal.

Jos. A. Osborn, Chief Elec. Engineer, American Car & Foundry Co., 915 Olive St., St. Louis, Mo. Recommended by J. J. O'Brien and C. F. Smith.

James Paton, V. P., St. Louis Surfacers & Paint Co., 3859a Greer Ave., St. Louis, Mo. Recommended by M. O'Brien and B. W. Frauenthal.

John M. Spangler, Steam R. R. Representative, National Carbon Co., St. Louis, Mo. Recommended by L. R. Mann and B. W. Frauenthal.

M. J. Turner, Clerk, Magnus Co., 4153 Clayton Ave., St. Louis, Mo. Recommended by F. A. Croft and Henry Heilman.

C. M. Viley, President, Perolin Railway Service Company, St. Louis, Mo. Recommended by A. R. Thickett and B. W. Frauenthal.

THE PRESIDENT: These applications will be passed upon by the Executive Committee and will be submitted for your approval or rejection at the next meeting, which will be held in this hall on Friday, November 9th, and I am pleased to announce that the Topics Committee have secured for that evening Mr Edward F. Kearney, President of the Wabash Railway (a past President of this Club), one of our most distinguished citizens and who has always interested himself in the activities of the Club. While the subject is unannounced, the reputation of the speaker, coupled with the fact that his views on any question pertaining to the railroads are held in highest esteem throughout the United States, gives us assurance that any subject on which he will speak will be worth more than ordinary attention, and we hope that this hall will prove too small for the attendance that night.

If there is no further business before the Club it will stand adjourned.

DIED

J. VAN SMITH

OCTOBER 9, 1917

ST. LOUIS, MO.

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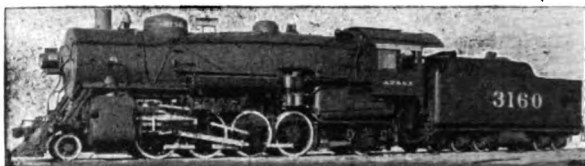
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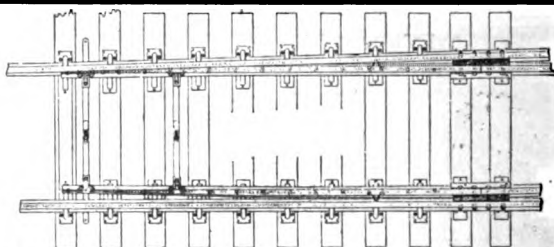
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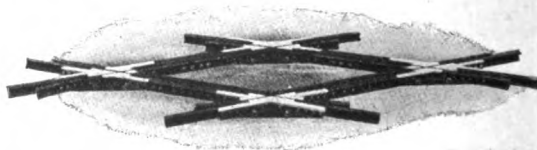
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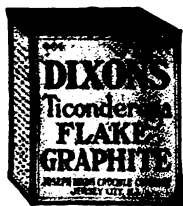
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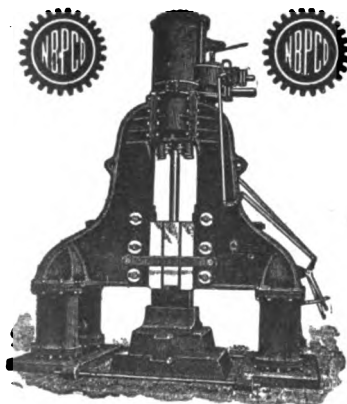
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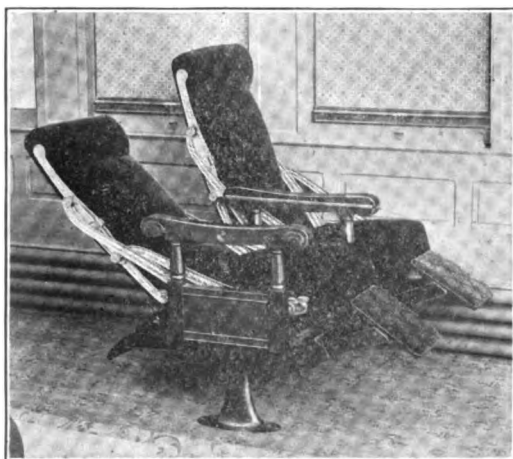
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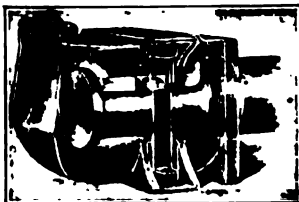
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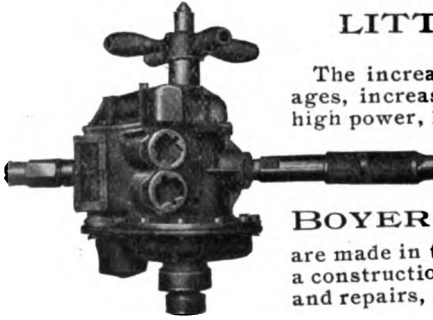


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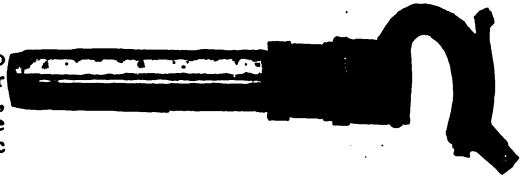
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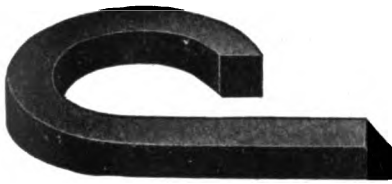
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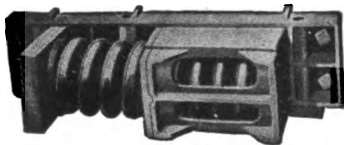
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